

SARDAR DYAL SINGH

PUBLIC
LIBRARY

NEW DELHI

★
R

Class No. 032

Book No B718E

Accession No. 2401.

Vol

EVERYMAN'S ENCYCLOPAEDIA

FOURTH EDITION

IN TWELVE VOLUMES

VOLUME ONE

A — BAPTISTS

EDITED BY E. F. BOZMAN, M.A. (Cantab.)

EVERYMAN'S ENCYCLOPAEDIA

FOURTH EDITION

IN TWELVE VOLUMES
VOLUME ONE



LONDON: J. M. DENT & SONS LTD

© J. M. DENT & SONS LTD, 1958
Aldine House · Bedford Street · London
Made in Great Britain
at
The Aldine Press · Letchworth · Herts
Paper supplied by
The Ryburndale Paper Mills Co. Ltd
First edition 1913-14
Second edition 1931-33
Third edition 1949-50
Fourth edition 1958

PREFACE

THE fourth edition of *Everyman's Encyclopaedia* is more fortunate than the second and third, each of which had to take into account the aftermath of a world war—so largely in fact did the Second World War loom when the late Athelstan Ridgway was editing the third edition that some 10 per cent of the total wordage was devoted to it. To counterbalance this, the effects of the cold war, while not so materially disruptive as those of the great wars, have already proved to be politically and culturally far-reaching, especially in the Middle and Far East, and every attempt has been made to obtain the latest information from these areas right up to the time of going to press.

Advantage has been taken of the comparatively peaceful 1950's to carry out a much more drastic revision of the basic material than has been possible hitherto. To this end the entire work was divided up into sections of knowledge, each of which was reorganised and re-balanced within itself before being redistributed under its alphabetical headings in the body of the work as a whole. The effect of this method has been to ensure a uniformity of treatment and approach which was absent from the enlarged second and third editions, and which readers will be able to test for themselves with the aid of the interlocking cross-references that have been provided. For the convenience of the reader, too, it has been a matter of policy to break up the very long articles as far as possible and distribute them under appropriate sub-headings in their alphabetical order. Short articles for quick reference are again an outstanding feature. Thousands of articles, both long and short, have been entirely rewritten so as to cover the latest advances in human knowledge, especially in the field of Science, and the number of illustrations has been increased. The method of revision adopted for this edition has the further advantage that in reviewing their sections as a whole the contributors have been able to preserve a just balance between the topical event, which is given such prominence by press and radio, and the findings of centuries of civilisation, the summary of which is an encyclopaedia's primary concern.

The articles themselves, which are the composite work of numerous experts within their own fields, are, as in the previous editions, unsigned. To the many learned contributors I should like to express my sincere gratitude for their willing and constructive co-operation, without which the difficulties of my task would have been immeasurably increased.

1958

E. F. B.

ABBREVIATIONS

The titles of subjects, which are printed first in bold type, have been abbreviated within each article to the initial letter or letters.

ac., acre(s).
agric., agricultural.
ambas., ambassador(s).
Amer., American.
anct., ancient.
ann., annual.
arron., arrondissement.
A.-S., Anglo-Saxon.
A.V., Authorised Version.
b., born.
Biog. Dic., Biographical Dictionary.
bor., borough.
bp., birthplace.
Brit., British.
c., about.
C., Centigrade.
cap., capital.
cent., century (7th cent.).
chem., chemistry.
co., county.
com., commune.
cub. ft., cubic feet.
d., died.
Dan., Danish.
dept., department.
dimin., diminutive.
dist., district.
div., division.
E., east; eastern.
ecoles., ecclesiastical.
ed., edition; edited.
educ., educated.
e.g., for example.
Ency. Brit., *Encyclopædia Britannica*.
Eng., English.
estab., established; establishment.
fl., flourished.
Flem., Flemish.
fort. tn., fortified town.
Fr., French.
ft., feet.
Ger., German.
Gk., Greek.
gov., government.
Heb., Hebrew.
hist., history.
horticult., horticultural.
h.p., horse-power.
H.Q., headquarters.
hr(s), hour(s).
in., inch(es).
inhab., inhabitant(s).
is., island(s).
It., Italian.
Jap., Japanese.
jour., journal.
Lat., Latin.

lat., latitude.
lb., pound(s).
l. b., left bank.
long., longitude.
m., mile(s).
manuf., manufacture.
M.E., Middle English.
min., minute(s).
Mod. E., Modern English.
m.p.h., miles per hour.
mrkt tn., market town.
MS., MSS., manuscript(s).
mt, mts., mount, mountain(s).
N., north; northern.
N.T., New Testament.
O.E., Old English.
O.F., Old French.
O.T., Old Testament.
oz., ounce(s).
par., parish.
parl., parliamentary.
pop., population.
prin., principal.
prof., professor.
prov., province; provincial.
pub., published; publication.
R., riv., river.
R.A.F., Royal Air Force.
r. b., right bank.
rep., republic.
Rep. of Ireland, Eire.
R.N., Royal Navy.
Rom., Roman.
r.p.m., revolutions per minute.
R.V., Revised Version.
S., south; southern.
sec., second(s).
sev., several.
Sp., Spanish.
sp. gr., specific gravity.
sq. m., square miles.
temp., temperature.
ter., territory.
tn., town.
trans., translated; translation.
trib., tributary.
U.K., United Kingdom.
U.N., United Nations.
univ., university.
U.N.O., United Nations Organisation.
urb., urban.
U.S.A., United States of America.
vil., village.
vol., volume.
W., west; western.
Wm., William.
yd(s), yard(s).

A

A: 1. First letter of the Eng. alphabet, as of all the European alphabets. It is derived through the Lat. and Etruscan from the Gk *alpha*, and we still retain in our cap. A the Gk and Rom. lapidary form. The Greeks, who learned the art of writing from the Phoenicians, borrowed this letter from the Semites. Indeed, whereas the Gk name is meaningless, the Semitic name, *aleph*, is a word in the Semitic languages meaning ox. The modern name of the letter A is of Etruscan origin. Our small a, in both its forms, italic *a* and roman *a*, derives from the Caroline form (employed in the Frankish empire at the end of the 8th cent.), which in its turn descended from the semi-uncial book-hand. The Venetian minuscule, nowadays known as *italica* (introduced in Florence in the 15th cent.), and the Rom. type of letter (perfected in N. Italy, chiefly at Venice, where it was used in the printing presses about the end of the 15th cent.), were adopted here, from Italy, in the 16th cent. The black letter or Gothic, also developed from the Caroline (at the end of the 12th cent.), and employed in NW. Europe, including England, until the 16th cent., is still used in Germany as the 'national' hand. The Semitic *aleph* was (and still is, for instance, in Heb.) a consonant, not a vowel. Its sound was that of a guttural breathing, and, strange to say, this sound is perhaps the most commonly represented by our own A, as in *aboard*, *aground*, etc. The Greeks adopted the symbol to represent what is now the general continental pronunciation of A, which is rare in Eng.: this is the purest and simplest vowel sound, and is uttered by opening the air passage to its fullest extent, as in *father*. It is regarded as the primitive vowel sound.

A is readily interchanged with O, as in the Ger. and Eng. *kalt*, *cold*. It is interchanged also with E. Thus the Romans generally substituted an A where we now find E in Ger. names, as *Albis* for *Elbe*; *Amisia* for *Emis*. A is interchanged with I, as in the Gk *α*, *an-* and the Lat. *in-*, and in the Lat. *sine* and the Fr. *sans*. The numerical value of *a* is 1 in most alphabetical scripts. See ALPHABET.

2. In music, the sixth note of the diatonic scale of C major. The key of A major contains F♯, C♯, and G♯, and its relative minor is F♯. The key of A minor has no key signature, though it requires G♯ for its leading note. It is relative to the major key of C.

3. Or *An*, the indefinite article, *a* being used before a consonant, *an* before a vowel; as *a king*, *an emperor*. Sometimes a virtual consonant exists at the beginning of a word without being written, as in *union* and *once*; before these words it is customary to drop the final letter of the article in conversation and writing. When an *h* is mute, however, we may at

the risk of ~~being misunderstood~~ take the *n* in writing and speaking; thus *a history*, *an historical work*. That *an* and not *a* was the original form is proved by the A.-S. *an* and the Ger. *en*; indeed our numeral one is nothing but a form of it. The *a* in 'three shillings a pound,' however, is not an indefinite article but a deteriorated form of an O.E. preposition. The double form of our article has caused certain words to be wrongly written, as *a newt* for *an ewt* (*eft*). The letter *a* often appears prefixed to a word, as in *aside*, *afoot*, *aboard*, *nowadays*, etc.; these are derived from *on syde*, *on fote*, *on borde*, *now-on-daies*, all of which forms are found in our early Eng. poets; this *on* is an A.-S. preposition meaning *in*. In many places a *now* takes the place of *on*, as 'he fell asleep,' which in an old version of the N.T. was 'he fell on sleep.'

A Becket, Thomas, see BECKET, THOMAS.
A Beckett, Gilbert Abbott (1811-56), humorous writer, b. London. Educ. at Westminster School, he was called to the Bar and became a magistrate. He was one of the first contributors to *Punch*, and also wrote for *The Times*, *Morning Herald*, and *Illustrated London News*. He wrote over 50 plays, and helped to dramatise some of Dickens's novels, but is best remembered as the author of comic hist. of England and Rome, and *Comic Blackstone*, 1846.

A Cappella (It., 'in church style'), musical term used in reference to compositions in which the vocal parts have no instrumental accompaniment. Formerly it was also used for vocal compositions in the accompaniment of which octaves and unison only were employed, and as an equivalent for the tempo direction *alla breve*.

A Capriccio (It., 'capriciously'), musical term which indicates that the composition may be played in time and expression according to the will of the instrumentalist.

A Priori and A Posteriori. The contrast between these 2 methods of reasoning does not now imply exactly what it did in earlier times. By an *a priori* argument was originally meant one from law or cause to effect; by a *posteriori*, one from effect to cause. Kant (q.v.) introduced a new distinction. Reasoning on the fundamental laws of the mind, he asserts that there are certain 'transcendental ideas' (called by him *categories*), which exist independently of experience, and arguments from these are *a priori*. Such ideas are those of space, time, reality, negation, and others, which, he says, we do not derive from experience, but through the application of which we acquire experience. In morality also he declares that the ideas implied in the words good and bad are innate and imperative in every mind, independently of actual observation. A *posteriori*

arguments, on the other hand, are deduced from experience founded on observation. That school of philosophy which sets the highest value on the Kantian *a priori* reasoning is called Institutional or Transcendental; the opposing section are called Empiricists.

A tempo (It., 'in time'), musical term used to indicate a reversion to the time at the beginning of a movement, when that time has been altered, e.g. *ad libitum*, *a piacere*, or for a longer time, e.g. *piu lento*, *piu allegro*, etc.

Aa (from Old Ger. *aha*, water), name of

the Dutch and Belgian borders. It was known as a spa in Rom. times, and it became the N. cap. of the empire of the Carolingians (q.v.). Twenty-eight of the Holy Rom. emperors were crowned in the city, the last being Ferdinand I (q.v.). A treaty signed at A. in 1668 ended the War of Devolution (q.v.), and a treaty of 1748 ended the War of the Austrian Succession (see AUSTRIA, History). The city was in Fr. hands in 1792 and again from 1794 to 1815. In 1815 it went to Prussia, and in 1818 a great congress was held in the city for settling the

AACHEN:
KAISERDOM



Paul Popper

sev. small rivs.—3 in Germany, 3 in Switzerland, 2 in Holland, 2 in Latvia, and 1 in France. The Fr. riv. rises near Desvres, and flows through St-Omer to the N. Sea at Gravelines.

Aabenraa (Ger. *Apenrade*): 1. Amt in S. Jutland, Denmark. From 1864 until 1920 the prov. was part of the plebiscite of Germany. Area 305 sq. m.; pop. 49,000.

2. Cap. of the above, seaport on an inlet of the Little Belt; it has a good harbour and considerable transport trade, besides fishing, shipbuilding, and other industries. Pop. 13,800.

Aach, Ger. tn in the *Land* of Baden-Württemberg (q.v.), near the Swiss border, 65 m. S. by W. of Stuttgart (q.v.). It has a pilgrims' chapel, and its mineral spring is the strongest in Germany. Pop. 1100.

Aachen (Fr. *Aix-la-Chapelle*), Ger. city in the *Land* of N.-Rhine-Westphalia (q.v.), 45 m. SW. of Düsseldorf (q.v.), near

affairs of Europe after the Napoleonic wars. During the First World War it was for a time the Kaiser's H.Q. During the Second World War it was very severely damaged. The cathedral, in which Charlemagne (q.v.) is buried, has a wonderful Gothic choir; the Palatine chapel (whence the Fr. name) dates from the 9th cent. Among the other notable buildings of the city is the 14th-cent. tn hall, built on the site of Charlemagne's palace. A. is in a rich coal-mining dist., and has iron, chemical, textile, and glass industries. The mineral springs are the hottest in central Europe. Pop. 148,900.

Aalborg: 1. Amt in N. Jutland, Denmark. The N. part is low, and much of the region is covered by forests and moors. Area 1130 sq. m.; pop. 233,000.

2. Cap. of the above, on the S. side of the Lim Fjord. It has a Gothic cathedral and is the seat of a Lutheran bishopric. A modern festival and concert hall was built in 1949-53. There are cement

works, textile and tobacco factories, and shipbuilding yards. The tn was used as an air base by the Germans in 1940 and was bombed by the R.A.F. Pop. 83,210.

Aalen, Ger. tn in the *Land* of Baden-Württemberg (q.v.), on the Kocher, 42 m. E. of Stuttgart (q.v.). It was once a free city of the empire, and has fine old houses and the oldest baroque church in Germany. There are Rom. remains in the dist. Textiles and iron and leather goods are manuf. Pop. 26,000.

Aalesund (*Alesund*), tn in Romsdal, Norway; a great port for herring-fishing;

Aar, largest riv. entirely within Switzerland, trib. of the Rhine; rises W. of the Grimsel pass (q.v.) and flows through Lakes Brienz and Thun, joining the Rhine near Waldshut. On its banks are Meiringen, Interlaken, Thun, Bern, Solothurn, Aarburg, Olten, Aarau, and Brugg. It has sev. tribs., including the Reuss and Limmat. It is 180 m. long.

Aarau, cap. of the canton of Aargau, Switzerland, on the R. Aar, 40 m. N.E. of Bern; manufs. silk, leather, cotton goods, mathematical instruments. At A. the assembly of the diet of the cantons met



Aalborg Turistforening

AALBORG: OLD TOWN HALL AND THE STONE HOUSE OF THE AALBORG MERCHANT, JENS BANG

burnt down in 1904, but rebuilt since; bp. of Hollo. Has broadcasting station. Pop. 19,000.

Aali Pasha (1815-71), Turkish statesman. At the Congress of Paris (1856) he represented Turkey, and maintained her rights with great skill. He helped to put down the Cretan rebellion (1867-8) and subdued the Khedive of Egypt (1869).

Aalst, see **ALOST**.

Aalter, see **AELTRE**.

Aalto, (*Hugo*) **Alvar** (1898-), Finnish architect, tn-planner, and furniture designer, awarded R.I.B.A. royal gold medal for architecture, 1957. Prin. buildings: library, Viipuri (1927-35); sanatorium, Paimio (1929-33); Finnish pavilions at the Paris exhibition (1937) and New York (1939); students' hostel at Cambridge, Massachusetts (1947); Pensions Office, Helsinki (1956); flats in the Tiergarten, Berlin (1957).

Aaltonen, **Wäinö** (1894-), Finnish sculptor and academician. His sculptures in granite are famous.

(1798), and proclaimed the Helvetic Republic (q.v.), of which A. became the cap. for a short time. Pop. 14,900.

Aardvark, the (Cape ant-bear), *Oryzomys*, is not closely related to the edentate ant-eaters, but on account of various peculiarities of structure is placed in a separate order, *Tubulidentata*. It has large pointed ears, tapering snout and tail, stumpy legs, a long slimy tongue, and little hair on its body. Its name (*aardvark*) is the Dutch for earth-pig, and is very appropriate, as it resembles the pig in its burrowing and grubbing, for which its sharp snout is of great use. Its hams are esteemed as good as those of a pig. When fully grown it is about 5 ft long. During the heat of the day it lies in its burrow. It is the only ant-eater possessing teeth, having 7 molars on each side above and 6 below. It is very timid, and if pursued burrows very rapidly: it can be killed by a smart blow on the snout. There are sev. species found in different parts of Africa S. of the Sahara. See **ANT-EATER**.

Aardwolf, the (*Proteles cristatus*), is an African animal 3 ft 6 in. in length, of yellowish-grey colour, with heavy dark stripes and a long bushy tail. It resembles a young hyaena. The molar teeth are very small and placed some distance apart. There are a total of 30 or 32 teeth. As its name indicates, it is a burrowing animal, of nocturnal habits and timid disposition; it is like the hyaena in its taste for carrion and termites, which it digs up with its sharp claws.

Aarestrup, Carl Ludwig Emil (1800-56), Dan. poet, b. Copenhagen. He was a doctor by profession, and did not gain great popularity as a poet during his lifetime. The pub. of *Digte*, 1838, went unnoticed, although his strongly erotic *Efterladte Digte*, 1863, caused some stir. But it was not till after his death, when Brandes ed. his *Samlede Digte*, 1877, that he became known as one of the greatest Dan. lyric poets. See G. Nygaard, *E. Aarestrup*, 1918.

Aargau (Fr. Argovie), canton of N. Switzerland, taking its name from the Aar, which flows through it. It is bounded on the N. by the Rhine; on the S. by the canton of Luzern. Area 548 sq. m. Previously the centre of the Hapsburgs and taken from them by the Swiss Confederates in 1415, A. was admitted to the Swiss Confederation in 1803. In the fertile parts the people are engaged in agriculture, dairy-farming, and cattle-breeding. Prin. tns: Aarau (cap.), Baden, Brugg, Laufenburg, Lenzburg. Pop. (1955) 320,600; the majority are Protestants.

Aarhus: 1. Amt in E. Jutland, Denmark. The soil is fertile and agriculture is carried on. Area 310 sq. m.; pop. 210,400.

2. Cap. of the above, and second port in Denmark, on the E. coast of Jutland. It is an important industrial centre, has motor, locomotive, and electrical works, and shipbuilding yards. The tn has been the seat of a (now Lutheran) bishop since the 10th cent., and has a large cathedral. There is a new univ. which was opened in 1933. Pop. 119,000.

Aaron (Heb. *Aharón*), brother of Moses, 3 years his senior and a man of influence with his tribe, the Levites. A. became the associate and spokesman of his brother in their interviews with Pharaoh (Exod. iv-v). The priesthood was fixed in his line (Exod. xxviii). While Moses was on Sinai A. was intimidated into making the golden calf (Exod. xxxii); yet he was not deprived of the priesthood. His consecration (Lev. viii) was ratified by the budding of his rod (Num. xvii). He married Elisheba and had 4 sons.

Aaron's Beard, name given to (1) *Hypericum calycinum* (q.v.); (2) *Saxifraga sarmenlosa*; and (3) *Verbascum thapsus* (q.v.).

Aaron's Rod, see MULLEIN.

Aarschot, tn in the prov. of Brabant, Belgium, on the R. Demer. It was a fortified crossing place in Rom. times. In Aug. 1914 the Gers. shot more than 150 of its inhab. on various pretexts; the tn

suffered severe war damage, until the Belgians retook it in Sept. During the Second World War A. was a target for air-raids. It is an important agric. centre. Pop. 11,600.

Aartsen, Pieter, see AERTSEN, PIETER. **Aasen**, Ivar (1813-96), b. Sunnmøre, Norway; self-educ.; studied the Norwegian country dialects, and constructed from them (connecting them with Old Norwegian) a standard dialect, now known as *nynorsk* (or modern Norwegian). This developed into the *landsmål*, which is one of the two literary languages of Norway, the other being the *riksmål* or *bokmål*, which is a development of Dan. (at one time the official and literary language of Norway); pub. a grammar (1848) and a dictionary (1850) of the 'Norwegian Popular Language'. In the *landsmål* A. wrote plays and poems.

Aavasssa, hill in Finland, near Tornio, forming an excellent vantage ground for witnessing the phenomenon of the midnight sun.

Ab, eleventh month of the Jewish civil year, corresponding to a part of July and a part of Aug.; it does not occur in the A.V. of the Bible, but is often found in the Talmud.

Ababde, vil. of Middle Egypt, on the Nile, near which are found ruins of Antinöe, a city built by Hadrian and named after Antinous, and also ruins of Besa.

Abaca, Philippine name for *Musa textilis*, yielding fibre for ropes and cordage; cultivated in the Philippines, whence exported; resembles banana in growth. See BANANA; FIBRE; HEMP; MANILA HEMP.

Abaco, see BAHAMAS.

Abacus: 1. Instrument used for aiding calculation; the name may be given to any machine for counting with beads, etc., in which one row stands for units, another for tens, etc. In England it is only used nowadays in infant schools to teach children to count. Used by Romans and still used in parts of Russia, China, and Persia. The early A. was a board strewn with sand on which rows of pebbles were laid.

2. In architecture a flat padstone between the capital and the supporting column, designed to concentrate the load.

3. A sideboard.

Abadan, ls. of Persia, at head of Persian Gulf, has important oil refinery and port. Pop. 65,000.

Abaddan, Heb. for 'destruction,' occurs in the O.T. as a synonym for Sheol (Hades) and Death. In Rev. ix it is the name of the angel (devil) of the bottomless pit—perhaps Hell personified. The Gk trans. Apollyon (destroying) is given with perhaps a punning reference to Apollo, whose symbol was the locust.

Abadeh, dist. and tn, Persia, half way between Isfahan and Shiraz, noted for wood-carving. Pop. of tn 8000.

Abaka, see ABACA.

Abakan, tn on the Yenisey in S. Siberia, cap. of the Khakas (q.v.) Autonomous Oblast and cultural centre of the Minusinsk basin (q.v.). It was founded in 1929. Pop. (1956) 48,000, largely Russian.

Aballo, see **AVALLON**.

Abalone, or ear-shell, a shell-fish of the family *Haliotidae*, found chiefly on Californian coasts, and largely used for food.

Abana (riv.), see **AMANA**.

Abancay, cap. of Apurimac, Peru, near Cuzco, noted for sugar. Pop. 15,000.

Abandonment, see **DERELICT**; **DOMICILE**; **HUSBAND** and **WIFE**; **INSURANCE**, **MARINE**; **NOLLE PROSEQUI**; **PARENT** and **CHILD**; **SALVAGE**.

Abanilla, Sp. morkt tn in the prov. of Murcia. Pop. 8800.

Abano, Pietro di, see **PETER OF ABANO**.

Abano Terme (anc't Aponi Fons, or Aquae Patavinae), It. spa, in Veneto (q.v.), 5 m. SW. of Padua (q.v.). It was the bp. of Pietro di Abano (q.v.). Pop. (tn) 2900; (com.) 8700.

Abantes, anc't inhab. of Euboea; said to have been of Thracian origin, and to have first settled in Phocia, where they built Abae, and afterwards crossed to Euboea; they assisted in colonising sev. of the Ionic cities of Asia Minor.

Abanus, Petrus, see **PETER OF ABANO**.

Abarbanel, **Abraham**, or **Abarbenel**, **Isaac Ben Jehudah** (1437-1508), Jewish statesman and author; b. Lisbon of an anc't Jewish family. Distinguished for his learning and wealth; minister of state to King Alfonso V. of Portugal. Suspected of treason by John II and had to escape. Served Ferdinand, King of Aragon, until the expulsion of Jews from Spain, 1492. Lived thenceforward in Naples and Venice, where he d., 1508. Wrote commentaries on the O.T. and the expected Messiah. His first son, *Leo Hebraeus* (Juda Leon), doctor and philosopher, wrote *Dialoghi di amore*, 1535; his second son, *Joseph*, was a doctor at Venice and Ferrara, and the third son, *Samuel*, a statesman.

Abaris, legendary Hyperborean priest of Apollo; came from near Caucasus to Greece during a plague; said to have taken no earthly food, and to have ridden through the air on an arrow, the gift of Apollo. See Herodotus, iv. 36.

Abas: 1. Son of Metanira; changed by Demeter into a lizard for mocking the goddess; when quenching her thirst in his mother's house, where she had wandered. See Ovid, *Metam.* v. 451-61.

2. 12th King of Argos; grandson of Danaus and father of Acrisius and Proetus; received the shield of Danaus, which had the power of subduing rebels.

Abasia, see **ABKHAZIA**.

Abate Ciccio, P., see **SOLIMENA**.

Abatement, derived from O.F. word *abatre*, to prostrate or destroy.

In a literal sense to destroy, as to abate or discontinue a nuisance. See **NUISANCE**.

In heraldry, a mark of dishonour on a coat of arms for some stain on the character of the wearer. The only A. now used is the *baston*, to indicate bastardy.

Abati, **Abatti**, or **Abbate**, **Niccolò dell'** (1512-71), painter, b. Modena. He worked in fresco under Primaticcio (q.v.). 'The Adventures of Ulysses,' in the palace at Fontainebleau, was destroyed, but prints were pub. by Van Thulden in Paris, 1630. His best-known easel work, 'The

Martyrdom of St Peter and St Paul,' painted on wood for the church of the Benedictines at Modena (1546), is now in the gallery at Dresden. He accompanied Primaticcio to France, where he d. at Paris (1571). His brother Pietro Paolo was a clever horse and battle painter. His son Giulio Camillo, his grandson Erocole, and his great-grandson Pietro Paolo were all painters; Erocole, b. Modena 1563, d. 1613, executed with B. Schidoni frescoes of the council hall of Modena.

Abatis, or **Abattis**, in military art a number of felled trees with the smaller branches cut off, placed side by side with their butt ends towards the defenders, and secured to the ground by forked pickets; serves as an obstacle to the advance of an enemy.

Abattoir, name given to the public slaughter-house established in Paris by a decree of Napoleon, and finished in 1818. An A. was first estab. in Great Britain at Edinburgh in 1851; another was estab. at Islington in 1855, and now many tns have them. The largest cattle- and hog-killing centre in the world is Chicago (q.v.). See also **ADULTERATION** and **SLAUGHTER-HOUSES**.

Abaza, Caucasian-speaking people in the Circassian Autonomous Oblast of N. Caucasus; they numbered (1926) 14,000. They are bilingual, and speak and write Kabarda (q.v.) as well as A.

Abba, Aramaic for father (Mark xiv. 36, Rom. viii. 15, Gal. iv. 6; always with its trans. subjoined). In the Syriac, Coptic, and Ethiopic Churches the title came to be applied to the bishops.

Abba-Comites, **Abbi-Comites**, see **ABBOT**.

Abbadie, **Antoine Thomas**, see **ABBOT**. **Abbadie**, astronomer, b. Dublin H. was educ. in France, and in 1835 was sent on a mission to Brazil by the Académie des Sciences. In 1837-48 he explored Abyssinia. He was made a member of the above academy in 1867, and in 1882 went to San Domingo to see the transit of Venus across the sun. His prin. work is *Géodésie de la haute Éthiopie* (Paris, 1873). His brother, Arnaud Michel (1815-93), b. Dublin, travelled with him. His prin. work is *Douze ans dans la haute Éthiopie* (Paris, 1868) a record of the travels and observations of both.

Abbadie, **Jacques** (1654-1727), b. Nay, educ. at Sedan, Saumur, and Puy-laurens, where he became D.D. In 1680 he was made pastor of a Fr. Protestant church in Berlin by Frederick William, elector of Brandenburg. In 1688 and 1689 he accompanied Marshal Schomberg to Holland, England, and Ireland, afterwards becoming pastor of the Fr. Church in the Savoy. In 1699 he was made dean of Killaloe by William III. He died in London. His chief works are *Traité de la vérité de la religion chrétienne*, 1684; *Traité de la divinité de Notre Seigneur Jésus-Christ*, 1689; *L'Art de se connaître soi-même*, 1692; *Défense de la nation britannique*, 1692 (in support of the 1688 revolution); *La Grande Conspiration d'Angleterre*, 1696 (written by order of William III).

Abbas (566-652), uncle of Mohammed and founder of the dynasty of the Abbasids (q.v.), who ruled as caliphs of Bagdad from 750 to 1258.

Abbas I, Shah of Persia 1587-1629, known as Shah A. the Great. He was b. 1571 or 1572, the son of Muhammad Mirza and the grandson of Tahmasp. At the time of his accession Persia was threatened by internal revolt and external attack by the Ottomans and the Uzbeks. Peace was made with Turkey in 1590, by the terms of which Persia lost various dists. in Azerbaijan and Georgia. A. then reduced rebels in the S., and in 1597 recovered Khorasan from the Uzbeks. He honourably received Sir Anthony and Sir Robert Shirley in 1598; and the following year Sir Anthony was sent to the Christian princes of Europe to offer them the shah's friendship with a view to some combination against the Turks. In 1601 the Turkish war was renewed and Persia regained the provs. which had been lost under A.'s predecessors. Kandahar was recovered in 1609. In 1622 a joint Persian and Brit. force evicted the Portuguese from Hormuz. During his reign A. encouraged commerce, granted immunities and privileges to European merchants, and promoted the prosperity of Persia. He made Isfahan the cap. of his kingdom. A. d. in 1629 and was succeeded by his grandson, Shah Safi.

Abbas II, Shah of Persia 1642-67. He was b. 1620. He received various embassies from Europe and treated Christians favourably. He recaptured Kandahar, which had been lost by his predecessor to the Great Moguls.

Abbas III, Shah of Persia 1732-6. He was b. 1732, and crowned shah when he was only 8 months old, Tahmasp Quli Khan (later Nadir Shah) becoming regent. He was the last of the Safavid dynasty.

Abbas Hilmy (1874-1923), last Khedive of Egypt, which, as A. II, he ruled before the First World War. Succeeded his father Tewfik on the throne of Egypt, 1892. He at first tried to overthrow Brit. rule; he abolished and reduced taxes, and disagreed with Lord Cromer and Lord Kitchener. He threw in his lot with Turkey in 1914; was deposed 18 Dec. 1914, and the khedivate passed, with the title of sultan, to Hussein Kemal Pasha, his uncle. He died at Vienna.

Abbas Mirza (1783-1833), second son of Fath Ali Shah, ruler of Persia. He was made governor-general of Azerbaijan at the age of 17. He commanded the Persian Army in the Russian wars of 1812-13 and 1825-8 (see *PERSIA, History*). He also commanded the Persian forces in the war with Turkey, concluded by the Peace of Erzerum (1823). In 1828 he made an expedition to Khorasan to restore Persian supremacy and d. besieging Herat in 1833. A. was an enlightened prince and sought to reorganise his army on European lines with the help of various European officers.

Abbas Pasha, Abbas I (1813-54), grandson of Mehemet Ali (Mohammed Ali). Became Viceroy of Egypt on the death of

his uncle, Ibrahim Pasha, 1848; and was found dead, probably murdered, 1854. He promoted the estab. of the railway from Alexandria to Cairo, 1851.

Abbasids, family of sovereigns who occupied the throne of the Arabian empire from AD 750 to AD 1258. The name is derived from their ancestor Abbas ben Abd-al-Motaleb, a paternal uncle of Mohammed. They made war on the Omayyad caliphs, who had occupied the throne of the Arabian empire from 661, and completely defeated them in a battle on the banks of the R. Zab, near Mosul, 750. Under Harun al-Rashid (786-808) the prosperity of the Abbasid empire was very great, flourishing tns were estab., and literature and the arts were encouraged; the splendour and luxury of the court of Bagdad are exhibited in many of the *Arabian Nights* tales. Under Mamun (813-33) colleges and libraries were founded, and works on astronomy, mathematics, metaphysics, natural philosophy, and medicine were trans. from the Sanskrit and Gk into Arabic. Later in the century the prosperity was broken by invasions by the Saracens and Turks, and by internal disturbances. From the time of Rhadi (939-40) almost all power had passed from the caliphs to the emirs al-Omara, and the caliphate then became a mere nominal dignity, with the possession of the tn of Bagdad. The last caliph, Mostasem, was defeated and killed by the Mongol chieftain Hulagu, 1258, and thus ended the gov. of the A.

Abbate, Niccolò dell', see *ABATI*.

Abbatas Milites, see *ABBOT*.

Abbaye, prison in Paris, close to the church of St-Germain-des-Prés, built between 1631 and 1635 as the manorial prison of the great abbey of St-Germain. Made into a military prison in the revolution, it was the scene of a terrible massacre on 2 and 3 Sept. 1792. It was demolished in 1854. See *Carlyle, The French Revolution* (Pt III, Bk 1, Ch. IV).

Abbe, Cleveland (1838-1916), Amer. meteorologist, b. New York. Studied astronomy at Ann Arbor and Cambridge (Massachusetts), and spent 2 years in Russia at the Pulkovo observatory. He became director of the Cincinnati observatory in 1868, and meteorologist of the weather bureau in 1891. Among his publications are *Report on Standard Time*, 1879; *Preliminary Studies for Storm and Weather Predictions*, 1889; *The Mechanics of the Earth's Atmosphere*, vol. 1, 1891; vol. 2, 1909; *Physical Basis of Long-range Forecastings*, 1902.

Abbe, Ernst (1840-1905), Ger. physicist, b. Eisenach. Studied at Göttingen, and joined the firm of Zeiss in 1866, of which he became sole owner in 1888. He made important contributions to the theory and practice of the design of optical instruments, and introduced many new optical glasses.

Abbé, originally the Fr. term for abbot. Before the Fr. Revolution it was applied to many persons who had little or no connection with the Church, but who acted

as tutors, profs., and men of letters. 'Abbes commendataires' were persons who received revenues from their monasteries, but who were not necessarily monks. The title A. is now applied to any Fr. priest who is not a member of a religious order, as well as to abbots.

Abbess, superior of a nunnery (usually Benedictine) which has canonical status as an abbey, usually elected by the sisters subject to the approval of the bishop. In the Rom. Catholic Church an A. possesses the same dignity and exercises the same functions as an abbot, except those of his priestly order. According to a decree of the Council of Trent, an A. at the time of her election should be at least 40 years of age, and should have made profession for 8 years; and it is forbidden that any person be elected to the dignity who has not been professed for 5 years, or is under 30 years of age.

Abbeville, Fr. tn in the dept of Somme, near the mouth of the R. Somme. Historically it is noted for two treaties which have borne its name—one between Henry III of England and Louis IX of France in 1259, and the other between Henry VIII of England and Francis I of France in 1527. The church of St Wolfram has a remarkable flamboyant facade; the church was seriously damaged during the Second World War, and many other fine old buildings in the tn were destroyed. Manufs. are sugar, textiles, carpets, and there is an agric. market. Pop. 15,300.

Abbey, Edwin Austin (1852-1911), Amer. painter and illustrator, b. Philadelphia. In 1878 he was sent by Harper Brothers of New York to England to gather material to illustrate Herriek's poems. His delightful illustrations to Herriek, Goldsmith, and Shakespeare secured his fame. From 1891 to 1902 he was engaged on a series of panels, 'The Quest of the Holy Grail,' for the Boston Public Library, and in 1901 he was commissioned by Edward VII to paint his coronation. Among his pictures may be mentioned 'A May-Day Morning,' 'Flammetta's Song,' 'Crusaders Sighting Jerusalem,' 'Pot-pourri,' and 'A Measure.' In 1896 he was elected A.R.A., and in 1898 he became an R.A.

Abbey (from the O.F. *abaie*), religious community presided over by an abbot or abbess; a building occupied by the community; the church of a monastery, or a private dwelling-house built on or converted from the remains of an A. dissolved at the Reformation and granted to lay owners. See MONASTERY.

Abbey Theatre, Dublin, the most famous of all modern Irish theatres. Ireland, and in particular Dublin, has always been a great centre of theatrical art, and many famous players were of Irish birth. At one time Dublin stood second only to London as the centre of the drama in the Brit. Isles, as they then were.

The Irish dramatic movement, founded by W. B. Yeats and Lady Gregory (q.v.), saw the necessity of having a theatre largely devoted to Irish plays and Irish players. When in 1901 their amalgama-

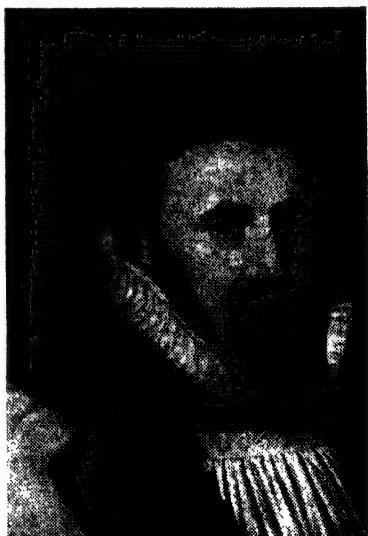
tion with the company led by W. G. Fay (q.v.) took place, they set about founding a theatre, and with the aid of the celebrated Miss Horniman of Manchester the A. T. arose. Lady Gregory did much to finance its early days but it became self-supporting in 1910, although now there is also a small gov. subsidy. It became world famous as a specialised repertory theatre and from it came well-acted plays of fine quality. It is not too much to say that in its heyday it had on its stage some of the finest acting in the world. It had its own methods of production, staging, and acting which suited it admirably, and many distinguished players graduated there. It was burned down in 1951 and is now in process of being rebuilt.

Abbeyleale, mkt tn of Limerick co., Rep. of Ireland, on the R. Feale. Pop. 1200.

Abbeyleix, tn of Laois co., near Portlaoise, Rep. of Ireland. Pop. 800.

Abbiatograsso, It. tn in Lombardy (q.v.), 13 m. WSW. of Milan (q.v.) on the Naviglio Grand Canal. Near here Bayard (q.v.) was killed in 1524. Pop. 16,000.

Abbot, Charles, see COLCHESTER, BARON.



National Portrait Gallery

GEORGE ABBOT
Artist unknown.

Abbot, George (1562-1633), Archbishop of Canterbury, b. Guildford, Surrey, son of a cloth-worker; educ. at the grammar school, Guildford, and Balliol College, Oxford. He became private chaplain to Thomas Sackville, Lord Buckhurst, chancellor of the univ., 1592; master of Univ. College, 1597; dean of

Winchester, 1600; 3 times vice-chancellor of Oxford Univ., 1600-5. He was deprived of his authority, 1627, for opposing the doctrine of passive obedience preached by Dr Manwaring and Dr Sibthorp; but was summoned as usual to Parliament, 1628. His works include *Exposition on the Prophet Jonah*; *A Brief Description of the Whole World*, 1599.

Abbot, John (d. 1623), Brit. poet, educ. at Sidney Sussex College, Cambridge, taking the degree of B.D. in 1617. A Rom. Catholic, he wrote a poem entitled *Jesus Praefigured: or, a Poeme of the Holy Name*, 1623.

order, and when monastic institutions were first founded to the head monk of the institution (not necessarily a priest). In the Gk Church the corresponding title to A. was archimandrite (chief monk), or hegumenos (leader). In orders founded after the 10th or 11th cent. the title A. was discontinued, and superiors were known as priors, guardians, and rectors.

In dignity an A. is considered to stand next to a bishop. In England 26 A.s and 2 priors (wearing the mitre and carrying the crozier) used to sit in the House of Lords. Cardinal A.s were



The British Travel and Holidays Association

ABBOTSFORD, ROXBURGHSHIRE, ONE-TIME HOME OF SIR WALTER SCOTT

Abbot, Robert (1560-1617), elder brother of George A., Archbishop of Canterbury, educ. at the grammar school, Guildford, and Balliol College, Oxford. He became one of the chaplains in ordinary to James I, 1603; master of Balliol College, 1609-15; fellow of Chelsea College, 1610; Regius Prof. of Divinity at Oxford, 1612; and Bishop of Salisbury, 1615. He was a great preacher, and wrote theological works, including: *A Mirrour of Popish Subtilties*, 1594; *The Exaltation of the Kingdom and Priesthood of Christ*, 1601; *A Defence of the Reformed Catholicke of Mr W. Perkins*, 1606; *Antilogia adversus Apologiam Andreae Eudaemon Joannis*, 1613.

Abbot, title of the head of a monastery or abbey (usually Benedictine). The word 'abbot' or 'abbat' is derived through Aramaic *abba* from the Heb. *ab*, father. Originally the title was given as a mark of respect to any member of the clerical

those who presided over an estab. with sev. branches; and in Germany there were prince A.s as well as prince bishops. In the 10th cent. there were field A.s (in Lat. 'Abbates Milites') and A.-counts ('Abba-Comites' or 'Abbi-Comites'), secular persons who rendered military service in return for certain abbeys bestowed upon them by the prince, and this practice continued in Great Britain after it had been discontinued on the Continent.

An A. is usually elected by the monks, subject to the approval of the pope or of the bishop, according as the monastery is independent or under episcopal jurisdiction. There was at times friction between the A.s and the Church owing to an attempt by the A.s to free themselves from the authority of the diocesans. Some became independent and possessed great power and wealth. Long before the Reformation, however, their power was

reduced to narrow limits, and subjected in all material points to the civil authority.

Abbot of Unreason, Lord, or Abbot of Misrule, title of the master of Christmas revels, used respectively in Scotland and in England, while *L'abbé de Liesse* (i.e. Jollity) is the Fr. equivalent. In Walter Scott's *The Abbot*, the falconer Adam Woodcock masquerades as A. of U. under the name of Father Howleglass.

Abbotts Langley, tn and par. of Herts, England, 5 m. from Watford, said to be the bp. of Nicholas Breakspear (later Pope Adrian IV (q.v.)). The par. church was built in 1154. Pop. 7500.

Abbotsford, mansion in baronial style on the r. b. of the Tweed, 2½ m. W. of Melrose, Roxburghshire, Scotland, the home of Sir Walter Scott from 1812 until his death in 1832. It was formerly a small farm, which Scott bought in 1811. He built a villa, calling it A., and between 1817 and 1825 added further buildings, making it a picturesque and irregular estate. There are many Scott relics. See Lockhart's *Life of Scott*.

Abbotshall, see KIRKCALDY.

Abbott, Charles, see TENTERDEN, BARON.

Abbott, Edwin Abbott (1838-1926), teacher and scholar, b. London. He was educ. at the City of London School, of which he became headmaster 1865-89, and at St John's College, Cambridge, where he was Hulsean Lecturer in 1876. His most notable pub. was his *Shakespearean Grammar*, 1870, and he also wrote many theological works.

Abbott, Eleanor Hallowell (1872-), Amer. novelist, grand-daughter of Jacob A. (q.v.), b. Cambridge, Massachusetts. She was a teacher of Eng. for a time, and in 1908 married Dr Fordyce Coburn. Her novels, which were very popular, include *Molly Make-Believe*, 1912, *White Linen Nurse*, 1913, and *Little Eve Edgerton*, 1914.

Abbott, Emma (1849-91), Amer. singer, b. Chicago. She studied music in Europe, appeared in opera at Covent Garden, and later, having formed a company of her own, toured the U.S.A.

Abbott, Evelyn (1803-1901), scholar, b. Notts. He had a brilliant career at Oxford, but became permanently paralysed as a result of a hurdlng accident. Fellow of Balliol from 1874, he collaborated with L. Campbell in an ed. of Sophocles and in the *Life and Letters of B. Jowett*, 1897. He ed. *Hellenica* and the *Heroes of the Nations* series, for which he wrote *Pericles*, 1891, and pub. other classical works, including a *History of Greece*, 1888-99.

Abbott, Jacob (1803-79), Amer. author, b. Hallowell, Maine. He was educ. at Bowdoin College, where he graduated 1820, and at Andover. He entered the ministry of the Congregational Church, but he is best known by his writings—educational and religious. His first book, *The Young Christian*, 1832, was followed by about 200 others, the best among which were in the 28-vol. series of Rollo Books, instructive tales for the young in the manner of Day's *Sandford and Merton*.

Abbott, John Stevens Cabot (1805-77),

Amer. clergyman and historian, brother of Jacob A. (q.v.), b. Brunswick, Maine. He was educ. at Bowdoin College and the Theological Seminary, Andover, and became a Congregationalist minister, but from 1844 devoted himself to writing. Among his prin. works, which were very popular, are his *History of Napoleon Bonaparte*, 1852-5, hist. of the *Civil War in America*, 1863-6, and of *Frederick the Great*, 1871, and a number of biographies of Amer. presidents.

Abbott, Lyman (1835-1922), Amer. clergyman and author, b. Roxbury, Massachusetts, son of Jacob A. (q.v.). He succeeded Henry Ward Beecher in 1888 as minister of Brooklyn Congregational church, and in 1893 as editor of the *Outlook*. His works include *The Theology of an Evolutionist*, 1897, *Henry Ward Beecher*, 1903, *Reminiscences*, 1915, *What Christianity Means to Me*, 1921, and *Silhouettes of my Contemporaries*, 1922.

Abbottabad, tn in the NW. frontier area of W. Pakistan, once a military cantonment. Situated well up in the hills, it is a hot-weather resort.

Abbreviation, in music, consists of signs or terms used to facilitate the work of the composer and copyist. In organ music,



ABBREVIATION IN MUSIC

G.O. or Gr. = Great Organ, F.O. = Full Organ, etc. In pianoforte music, L.H. or M.S. (It. *mano sinistra*) or M.G. (Fr. *main gauche*) = left hand; R.H. or M.D. (It. *mano destra*, Fr. *main droite*) = right hand; ped. = depress pedal; * = release pedal. General A.s are ^ = pause; < or cres. = *crescendo*, get gradually louder; > or dim. = *diminuendo*, get gradually softer; f = loud; ff = very loud; mf = fairly loud; p = soft; pp = very soft; mp = fairly soft; D.C. (*da capo*) = repeat from the beginning of the movement; D.S. (*dal segno*) or § = repeat from previous sign §; ten. or *tenuto* = hold, or sustain; sf. or sfs. = *sforzando*, or *sforzato*, accentuate; rit. = *ritenuto*, slacken immediately in speed; rall. = *rallentando*, slacken gradually in speed; accel. = *accelerando*, quicken gradually; and so on. In full scores the instruments are named in abbreviation, e.g. Fl. = *flauto* or flute, Fag. = *fagotto*, Viol. or Vo. = violin, Va. = Viola, etc. Another kind of A. is shown in the

Abbreviations

Abbreviations

illustration; the passage A may be abbreviated into the form B, and C into D.

Abbreviations, methods by which the initial letter, the initial syllable, or a sign is made to represent a word or phrase, in order to save space and time. These methods were employed to a great extent in anct inscriptions, Gk and Rom. MSS., and documents. A. were also used in legal documents until the reign of George II. when they were discontinued. The following is a list of the most important A. used in England. (For chemical A., see ELEMENTS.)

A. A.A. *Automobile Association*. A.A.A. *Amateur Athletic Association*. A.A.A.S. *American Association for the Advancement of Science*. A.A.F. *Auxiliary Air Force*. A.A.G. *Assistant Adjutant-General*. A.A.I. *Associate of the Auctioneers' Institute*. A.A.S. (*Academae Americanae Socius*) *Fellow of the American Academy*. A.B. *Able-bodied (seaman)*; (*Artium Baccalaureus*) *Bachelor of Arts*. Abbr. or Abbrev. *Abbreviated*. A.B.C.A. *Army Bureau of Current Affairs*. Abp. *Archbishop*. Abr. *Abridged*. A.B.S. *American Bible Society*. A.C. (*ante Christum*) *Before Christ*. A.C.A. *Associate (of the Institute of) Chartered Accountants*. Acc. or Acct. *Account*. A.C.C.S. *Associate of Corporation of Certified Secretaries*. A.C.G.I. *Associate of City and Guilds Institute*. A.C.I.A. *Associate of Corporation of Insurance Agents*. A.C.I.B. *Associate of Corporation of Insurance Brokers*. A.C.I.S. *Associate of Chartered Institute of Secretaries*. A.C.S. *American Colonisation Society*. A.D. (*anno Domini*) *In the year of our Lord*. ad lb. (*ad libitum*) *At pleasure*. ad val (*ad valorem*) *At, or on, the value*. A.D.C. *Aide-de-camp*. Adm. *Admiral*. Admiralty. Adv. *Advocate*. Advent. Advt. *Advertisement*. A.E.C. *Army Education Corps*. aet., or aetat (*anno aetatis*) *Of age, Aged*. A.E.U. *Amalgamated Engineering Union*. A.F.A.S. *Associate of Faculty of Architects and Surveyors*. A.F.B.S. *American and Foreign Bible Society*. A.F.C. *Air Force Cross*. A.F. of L. *American Federation of Labour*. A.F.S. *Auxiliary Fire Service*. A.G. *Adjutant-General*. Accountant-General. A.G.S.S. *American Geographical and Statistical Society*. A.H. (*anno Hegirae*) *In the year of the Hegira* (AD 622). A.H.M.S. *American Home Missionary Society*. A.I.A. *Associate of the Institute of Actuaries*. *American Institute of Architects*. A.I.A.A. *Architect Member of the Incorporated Association of Architects and Surveyors*. A.I.C. *Associate of Institute of Chemistry*. A.I.C.A. *Associate of Institute of Company Accountants*. A.I.C.S. *Associate of Institute of Chartered Shipbrokers*. A.Inst.P. *Associate of Institute of Physics*. A.L. (*anno lucis*) *In the year of light*. Ala. *Alabama*. A.L.A. *Associate of the Library Association*. *American Library Association*. a.m. (*ante meridiem*) *Before noon*; (*anno mundi*) *In the year of the world*. A.M. (*Artium Magister*) *Master of Arts*. Am. Soc. C.E. *American Society of Civil Engineers*. A.M.A.

American Medical Association. A.M.D.G. (*ad maiorem Dei gloriam*) *To the greater glory of God*. A.M.I.A.E. *Associate Member of Institute of Automobile Engineers*. A.M.I.C.E. *Associate Member Institution of Civil Engineers*. A.M.I. Chem. E. *Associate Member Institution of Chemical Engineers*. A.M.I.E.E. *Associate Member Institution of Electrical Engineers*. A.M.I. Mech. E. *Associate Member Institution of Mechanical Engineers*. Anon. *Anonymous*. A.O.H. *Ancient Order of Hibernians*. A.Q.M.G. *Assistant Quartermaster-General*. A.R.A. *Associate of the Royal Academy*. A.R.A.M. *Associate of the Royal Academy of Music*. A.R.C.A. *Associate of the Royal College of Arts*. A.R.C.M. *Associate of the Royal College of Music*. A.R.C.S. *Associate of the Royal College of Science*. A.R.H.A. *Associate of the Royal Hibernian Academy*. A.R.I.B.A. *Associate of the Royal Institute of British Architects*. A.R.I.C. *Associate of Royal Institute of Chemistry*. Ariz. *Arizona*. Ark. *Arkansas*. A.R.P. *Air Raid Precautions*. A.R.R.C. *Associate of the Royal Red Cross*. A.R.S.A. *Associate of the Royal Scottish Academy*. A.R.S.M. *Associate of the Royal School of Mines*. A.R.S.S. (*Antiquarium Regiae Societatis Socius*) *Fellow of the Royal Society of Antiquaries*. A.R.W.S. *Associate of the Royal Society of Painters in Water Colours*. A.S. *Academy of Science*; (*anno Salvatoris or salutis*) *In the year of our Saviour or of salvation*. A.S.A. *Amateur Swimming Association*. *American Statistical Association*. A.S.L.E. and F. *Associated Society of Locomotive Engineers and Firemen*. A.S.L.I.B. *Association of Special Libraries and Information Bureau*. A.S.P.C. *American Society for Prevention of Cruelty*. A.S.S.U. *American Sunday School Union*. A.T.S. *American Tract Society*. *American Temperance Society*. Att. or Atty. *Attorney*. Atty.-Gen. *Attorney-General*. A.U.C. (*anno urbis conditae*, or *ab urbe condita*) *In the year of, or from the building of, the city, i.e. Rome (753 BC)*. A.U.S. *Army United States*. A.V. *Authorised Version*.

B. b. *Born, Bowled*. B.A. *British America, Booksellers' Association*; (*Baccalaureus Artium*) *Bachelor of Arts*. B.Agr. *Bachelor of Agriculture*. Balto. *Baltimore (U.S.A.)*. Bart. *Baronet*. B.B. *Boys' Brigade*. B.B.C. *British Broadcasting Corporation*. B.C. *Before Christ*. *British Columbia*. B.Ch. *Bachelor of Surgery*. B.C.L. *Bachelor of Civil Law*. B.Com. *Bachelor of Commerce*. B.D. (*Baccalaureus Divinitatis*) *Bachelor of Divinity*. B.E.A. *British European Airways*. *British Electricity Authority*. B.E.F. *British Expeditionary Force*. B.E.M. *British Empire Medal*. B.F.A. *Bachelor of Fine Arts*. B.L. or B.L.L. (*Baccalaureus Legum*) *Bachelor of Laws*. B.M. (*Baccalaureus Medicinae*) *Bachelor of Medicine*. B.M.A. *British Medical Association*. B.O.A.C. *British Overseas Airways Corporation*. Bp. *Bishop*. B.P. *British Public*. B.R. *British Railways*. Brig. *Brigadier*. Brigade. Brig.-Gen. *Brigadier-General*. B.Sc. *Bachelor of Science*. B.S.L. *Botanical Society, London*.

Abbreviations

11

Abbreviations

B.S.T. *British Summer Time*. Bt. *Baronet*.
 B.V.M. *Blessed Virgin Mary*.
 C. C. *Conservative, Centigrade, Centimetres; (centum) A hundred*. C.A. *Chartered Accountant (Scotland)*. C.A. *Controller of Accounts*. Cal. *California, Calendar; (calendae) Calends, Cam. or Camb. Cambridge*. Cant. *Canticles, Canterbury*. Cantab. (*Cantabrigiensis*) *Of Cambridge*. Cantuar. (*Cantuariensis*) *Of Canterbury*. Cap. *Capital; (caput) Chapter-number of Act of Parliament*. Capt. *Captain*. C.B. *Companion of the Bath*. C.B.E. *Commander of the Order of the British Empire*. C.B.S. *Confraternity of the Blessed Sacrament*. C.C. *County Council, County Commissioner*. County Court, *Crown Clerk, Contra Credit; (Compte Courante) Account Current*. C.C.C. *Corpus Christi College*. C.C.P. *Court of Common Pleas*. C.D. *Civil Defence*. C.E. *Civil Engineer, Christian Endeavour*. C.E.M.A. *Council for the Encouragement of Music and the Arts (Pilgrim Trust)*. cent. *Centigrade; (centum) A hundred*. Cestr. *Chester, cf. (confer) Compare*. C.F. *Chaplain to the Forces*. C.G. *Commissary-General, Consul-General*. Coast Guard. C.G.M. *Conspicuous Gallantry Medal*. C.G.S. *Centimetre-gramme-second*. Ch. *Church, Chapter*. C.H. *Companion of Honour, Court-House, Custom-House*. Ch.B. *Bachelor of Surgery*. Ch. Ch. *Christ Church, Chanc. Chancellor*. Chap. *Chapter*. Chr. *Christian*. C.I. (*Order of*) *Crown of India*. Cicestr. *Chichester*. C.I.D. *Committee of Imperial Defence, Criminal Investigation Department*. C.I.E. *Companion of the Order of the Indian Empire*. C.I.F. (usually c.i.f.) *Cost, Insurance, and Freight*. C.I.G.S. *Chief of Imperial General Staff*. C-in-C. *Commander-in-Chief*. C.I.O. *Congress of Industrial Organisations (U.S.A.)*. C.I.V. *City Imperial Volunteers (Boer War)*. C.J. *Chief Justice*. C.L.B. *Church Lads' Brigade*. cm. *Centimetre(s)*. C.M. *Common metre, Certificated Master; (Chirurgiae Magister) Master of Surgery*. C.M.G. *Companion of the Order of St. Michael and St. George*. C.M.S. *Church Missionary Society*. c/o. *Care of*. Co. *Company, County*. C.O. *Commanding Officer, Crown Office, Colonial Office, Criminal Office*. C.O.D. *Cash (or Collect) on delivery*. C. of E. *Church of England*. Col. *Colonel, Colonial, Colossians, Column*. Coll. *College, Collector, Collection, Colleague*. Coll. or Colloq. *Colloquial*. Colo. *Colorado*. Com. *Commissioner, Commadore, Committee, Commerce, Commentary, Common*. Comp. *Compare, Comparative, Compound, Compounded, Compar. Comparative*. Con. (*contra*) *Against, In opposition*. Con. Cr. *Contra credit*. Conn. *Connecticut*. Const. *Constable, Constitution*. Cor. *Corinthians*. Cor. Mem. *Corresponding Member*. Cor. Sec. *Corresponding Secretary*. Cos. *Cosine*. C.O.S. *Charity Organisation Society*. Cot. *Cotangent*. cp. *Compare*. C.P. *Common Pleas, Clerk of the Peace, Court of Probate*. C.P.C. *Clerk of the Privy Council*. C.P.R. *Canadian Pacific Railway*. C.P.S. (*Custos Privati Sigilli*) *Keeper of the Privy Seal*. Cr. *Credit, Creditor*. C.R. (*Custos Rotulorum*) *Keeper of the Rolls*. C.R.P.

(*Calendarum Rotulorum Patentium*) *Calendar of the Patent Rolls*. C.S. *Court of Session, Clerk to the Signet; (Custos Sigilli) Keeper of the Seal; (Christ Scientist) Christian Science Church*. C.S.A. *Confederate States Army*. C.S.C. *Conspicuous Service Cross*. C.S.I. *Companion of the Order of the Star of India*. C.S.M. *Company Sergeant-Major*. C.S.N. *Confederate States Navy*. ct. *Cent*. Ct. *Connecticut, Court*; (*centum*) *A hundred*. C.T. *Certified Teacher*. C.T.C. *Cyclists' Touring Club*. C.T.U. *Christian Temperance Union*. cur. *Current (i.e. this month)*. C.V. *Common Version*. C.V.O. *Companion Royal Victorian Order*. cwt. (*Lat. centum, a hundred, and Eng. weight*) *Hundredweight(s)*. D. d. *Died; D. Duke; (denarius or denarii) A penny or pence*. D.A. *District Attorney*. D.Agr. *Doctor of Agriculture*. D.B.E. *Dame Commander of the Order of the British Empire*. D.C. *District of Columbia; (da capo) Again, or From the beginning*. D.C.I. *Doctor of Civil (or Common) Law*. D.C.L.I. *Duke of Cornwall's Light Infantry*. D.C.M. *Distinguished Conduct Medal*. D.D. (*Divinitatis*) *Doctor of Divinity*. D.D.S. *Doctor of Dental Surgery, def. Defendant, deg. Degree, Degrees*. Del. *Delaware, Delegate, Delele; (delinavit) He (or She) drew it (affixed to the draughtsman's name)*. Dem. *Democrat, Democratic*. D.Eng. *Doctor of Engineering*. Dep. *Deputy, Department*. dept. *Department*. Depoent. *Dout. Deuteronomy*. D.F. *Dean of the Faculty*. D.F.C. *Distinguished Flying Cross*. D.F.M. *Distinguished Flying Medal*. D.G. (*Dei gratia*) *By the grace of God; (Deo gratias) Thanks to God*. diam. *Diameter*. Dist. *Atty. District Attorney*. D.Lit. or D.Litt. *Doctor of Literature*. D.L.O. *Dead Letter Office*. D.N.B. *Dictionary of National Biography*. do. (*ditto*) *The same*. dols. *Dollars*. D.O.M. (*Deo optimo maximo*) *To God the best and greatest (heading of dedicatory inscriptions)*. D.O.R.A. *Defence of the Realm Act*. D.P.H. *Department of Public Health*. D.P.O. *Distributing Post Office*. dr. *Dram(s)*. Dr. *Debtor, Doctor*. D.Sc. *Doctor of Science*. D.S.C. *Distinguished Service Cross*. D.S.M. *Distinguished Service Medal*. D.S.O. *Distinguished Service Order*. D.T. (*Doctor Theologae*) *Doctor of Theology, Delirium Tremens*. D.V. (*Deo volente*) *God willing*. D.V.S. *Doctor of Veterinary Surgery*. dwt. (*Lat. denarius, a penny, and Eng. weight*) *Pennyweight(s)*. E. E. *Earl, East*. E. & O.E. *Errors and omissions excepted*. Ebor. (*Eboracum*) *York*. E.C. *Eastern Central (postal district, London)*. E.C.U. *English Church Union*. ed. *Editor, Edition*. E.D. *Efficiency Decoration*. E.D.C. *European Defence Community*. E.E. *Errors excepted, e.g. (exempli gratia) For example*. E.I. *East Indies*. ency. *Encyclopaedia*. E.N.S.A. *Entertainments National Service Association*. Ep. *Epistle*. Eph. *Ephesians*. eq. *Equal, Equivalent*. E.R.P. *European Recovery Programme*. Esd. *Esdras*. Esq. *Esquire*. Esth. *Esther, et al. (et alibi) And elsewhere; (et alii or aliae) And others*. et

seq. (et sequentes or et sequentia) And the following, etc. or &c. (et ceteri, caeterae, or caetera) And others, And so forth. E.T.U. Electrical Trade Union. ex. Example, Exception. Exod. Exodus. exch. Eschequer, Exchange. Exon. (Exonia) Ezeler. exor. Executor. exr. Executrix. Ez. or Ezr. Ezra. Ezek. Ezekiel.

F. F. Fahrenheit. F.A. Football Association. F.A.A. Fleet Air Arm. F.A.A.M. Free and Accepted Masons. F.A.C.C.A. Fellow of Association of Certified and Corporate Accountants. Fahr. Fahrenheit. F.A.I. Fellow of Auctioneers' Institute. F.A.O. Food and Agricultural Organisation (of the United Nations). F.A.S. Fellow of the Antiquarian Society. F.B.A. Fellow of British Academy. F.B.A.A. Fellow of British Association of Accountants and Auditors. F.B.I. Federation of British Industries, Federal Bureau of Investigation (U.S.A.). F.C. Football Club, Free Church. F.C.A. Fellow of (the Institute) of Chartered Accountants. F.C.G.I. Fellow of City and Guilds Institute. F.C.I.A. Fellow of Corporation of Insurance Agents. F.C.I.B. Fellow of Corporation of Insurance Brokers. fep. Foolscap. F.C.P. Fellow of the College of Preceptors. F.D. (fidel defensor) Defender of the Faith. fec. (fecit) He did it (affixed to the craftsman's name). F.E.S. Fellow of the Entomological Society, Fellow of the Ethnological Society. feud. Feudal. F.F.A.S. Fellow of the Faculty of Actuaries. F.F.A.S. Fellow of the Faculty of Architects and Surveyors. F.G.S. Fellow of the Geological Society. F.H. Fire Hydrant. F.I.A. Fellow of the Institute of Actuaries. F.I.A.A. Fellow of the Incorporated Association of Architects. F.I.C.A. Fellow of the Institute of Company Accountants. F.I.C.S. Fellow of the Institute of Chartered Shipbrokers. F.I.I.A. Fellow of the Institute of Industrial Administration. F.Inst.P. Fellow of the Institute of Physics. F.J.I. Fellow of the Institute of Journalists. fl. (floruit) Flourished. Fla. Florida. F.L.A. Fellow of the Library Association. Flem. Flemish. F.L.S. Fellow of the Linnean Society. F.M. Field Marshal. F.M.S. Federated Malay States. fo. or fol. Folio. F.O. Field Officer, Flying Officer, Foreign Office. F.O.B. (f.o.b.) Free on board, for. Foreign. fort. Fortification. F.P. Fire plug. F.P.S. Fellow of the Philological Society. fr. Franc, From. Fr. France, French. F.R.A.I. Fellow of the Royal Anthropological Institute. F.R.A.M. Fellow of the Royal Academy of Music. F.R.A.S. Fellow of the Royal Astronomical Society, Fellow of the Royal Asiatic Society. F.R.C.M. Fellow of the Royal College of Music. F.R.C.O. Fellow of the Royal College of Organists. F.R.C.P. Fellow of the Royal College of Physicians. F.R.C.S. Fellow of the Royal College of Surgeons. F.R.C.V.S. Fellow of the Royal College of Veterinary Surgeons. F.R.G.S. Fellow of the Royal Geographical Society. F.R.H.S. Fellow of the Royal Horticultural Society. F.R.Hist.S. Fellow of the Royal Historical Society. F.R.I.B.A. Fellow of the Royal Institute of British Architects. F.R.I.C. Fellow of the Royal Institute

of Chemistry. F.R.S. Fellow of the Royal Society. F.R.S.A. Fellow of the Royal Society of Arts. F.R.S.E. Fellow of the Royal Society, Edinburgh. F.R.S.L. Fellow of the Royal Society of Literature, Fellow of the Royal Society, London. F.R.S.S. Fellow of the Royal Statistical Society. F.S.A. Fellow of the Society of Antiquaries, Fellow of the Society of Arts. ft. Foot (Feet), Fort. fur. Furlong. F.Z.S. Fellow of the Zoological Society.

G. g. Gramme(s). Ga. Georgia. G.A. General Assembly. Gal. Galatians, Gallon. G.A.R. Grand Army of the Republic. G.A.T.T. General Agreement on Tariffs and Trade. G.B. Great Britain. G.B.E. Grand Cross, Order of the British Empire. G.C. Grand Chapter, George Cross. G.C.B. (Knight) Grand Cross of the Bath. G.C.I.E. Grand Cross of the Indian Empire. G.C.L.H. Grand Cross of the Legion of Honour. G.C.M.G. Grand Cross of St Michael and St George. G.C.S.I. Grand Cross of the Star of India. G.C.V.O. Grand Cross of the Victorian Order. G.D. Grand Duke, Grand Duchess. Gen. Genesis, General. Ger. German. G.F.S. Girls' Friendly Society. G.H.Q. General Headquarters. G.L. Grand Lodge. G.M. Grand Master, George Medal. G.M.T. Greenwich Mean Time. G.O. General Order. G.O.C. General Officer Commanding. G.O.C. in C. General Officer Commanding in Chief. G.O.M. 'Grand Old Man' (Gladstone). G.O.P. Grand Old Party (the Republican Party, U.S.A.). G.P.O. General Post Office. Gr. Groat, Greek, Grain(s), Gross, Grade (1st, 2nd). G.R. (Georgius Rex) King George. G.S. General Secretary, General Service, Grand Scribe. Grand Sentinel. G.S.O. General Staff Officer. G.T. Good Templars, Grand Tylers.

H. H.A.C. Honourable Artillery Company. H.B.C. Hudson's Bay Company. H.B.M. His (or Her) Britannic Majesty. H.C. Herald's College. H.E. His Excellency, High Explosive. Heb. or Hebr. Hebrew, Hebrews. H.E.I.C. Honourable East India Company. hf.-bd. Half-bound. H.G. Home Guard, Horse Guards. H.H. His (or Her) Highness, His Holiness (the Pope). H.I. Hawaiian Islands. Hier. (Hierosolyma) Jerusalem. H.I.H. His (or Her) Imperial Highness. H.I.M. His (or Her) Imperial Majesty. H.I.S. (hic jacet sepultus) Here lies buried. H.L.I. Highland Light Infantry. H.M. His (or Her) Majesty. H.M.A.S. His (or Her) Majesty's Australian Ship. H.M.O.W. His (or Her) Majesty's Office of Works. H.M.P. (hoc monumentum posuit) Erected this monument. H.M.S. His (or Her) Majesty's Steamer, Ship, or Service. H.M.S.O. His (or Her) Majesty's Stationery Office. Ho. of Rep. House of Representatives. H.P. High Priest, Horse-power, Half-pay, High Pressure, House Physician, Hire Purchase, Houses of Parliament. H.Q. Headquarters. H.R.E. Holy Roman Empire, or Emperor. H.R.H. His (or Her) Royal Highness. H.R.I.P. (hic requiescit in pace) Here rests in peace. H.S.H. His (or Her) Serene Highness. H.T. Hawaiian Territory.

I. Ia. Iowa. I.A. Indian Army.

I.A.R.O. *Indian Army Reserve of Officers*.
 ib. or ibid. (ibidem) *In the same place*.
 I.C.A.O. *International Civil Aviation Organisation*. I.C.S. *Indian Civil Service*.
 id. (idem) *The same*. Ida. Idaho. I.D.B. *Illicit diamond buying*. i.e. (id est) *That is*. I.F.S. *Irish Free State* (now *Free*).
 I.G. *Inner Guard*. I.H.S. (Iesus Hominum Salvator) *Jesus the Saviour of Men*. Ill. *Illinois*. I.L.O. *International Labour Organisation*. I.L.P. *Independent Labour Party*. I.M. *In Memoriam*. Imp. *Imperial*; (Imperator) *Emperor*. in lim. (in limine) *At the outset*. in loc. (in loco) *In its place*. in trans. (in transitu) *On the passage*. incog. (incognito) *Unknown*. Ind. *India*. Indian, *Indiana*. I.N.R.I. (Iesus [or Jesus] Nazareus, Rex Iudaeorum [or Judaecorum]) *Jesus of Nazareth, King of the Jews*. inst. *instant* (the present month). Interpol. *International Police Commission*. Intro. *Introduction*. I.o.M. *Isle of Man*. I.O.O.F. *Independent Order of Odd Fellows*. IOU. *I owe you*. I.o.W. *Isle of Wight*. i.q. (idem quod) *The same as*. I.Q. *Intelligence Quotient*. I.R.A. *Irish Republican Army*. I.R.O. *Inland Revenue Office*. Irreg. *Irregular*. I.S. *Irish Society*. Is. or Isa. *Isaiah*. I.S.C. *Imperial Service College*. Indian Staff Corps (later Ind. Army). I.S.O. *Imperial Service Order*. It. or Ital. *Italian*. Italic. *Italy*. I.T. *Inner Temple*. Indian Territory. I.T.A. *Independent Television Authority*. itin. *Itinerary*. I.W.W. *Industrial Workers of the World*. I.Y. *Imperial Yeomanry*.

J. *Justice*. J.A. *Judge Advocate*. J.A.G. *Judge Advocate General*. J.C. *Jesus Christ*. J.D. *Junior Deacon*. Jer. *Jeremiah*. J.G.W. *Junior Grand Warden*. J.H.S. (see I.H.S.). Jno. *John*. Josh. *Joshua*. Jour. *Journeyman*. Journal. J.P. *Justice of the Peace*. J. Prob. *Judge of Probate*. jr. *Junior*. J.U.D. (Juris utriusque Doctor) *Doctor of both Laws* (i.e. the canon and the civil law).

K. Kan. *Kansas*. K.B. *Knight of the Bath*. King's Bench. K.B.E. *Knight Commander of the British Empire*. K.C. *King's Counsel*. Knight of Colombo. K.C.B. *Knight Commander of the Bath*. K.C.H. *Knight Commander of Hanover*. K.C.I.E. *Knight Commander of the Indian Empire*. K.C.M.G. *Knight Commander of St Michael and St George*. K.C.S.I. *Knight Commander of the Star of India*. kg. or kgr. *Kilogramme(s)*. K.G. *Knight of the Garter*. K.H. *Knight of Hanover*. Km. *Kilometre(s)*. Kingdom. K.G. *Knight of Malta*. K.M.H. *Knight of Merit* (Holstein). Knt. *Knight*. Bachelor. K.O.Y.L.J. *King's Own Yorkshire Light Infantry*. K.P. *Knight of St Patrick* (Ireland). K.S.L.I. *King's Shropshire Light Infantry*. Kl. or Knt. *Knight Bachelor*. K.T. *Knight Templar*. Knight of the Thistle (Scotland). Ky. *Kentucky*.

L. L. *London* (in degrees). Liberal; (liber) *Book*. L. or £. *A pound sterling*. La. *Louisiana*. Lab. *Labour*. Laboratory. L.A.C. *Leading Aircraftsman* (or *Aircraftswoman*). Licentiate of the Apothecaries' Company. Lam. *Lamentations*. L.A.S. *Lord Advocate of Scotland*. Lat. *Latin*. Latitude. lb. (libra) *Pound weight*. l.b.w. *Leg before wicket*. l.c. *Lower case*;

(loco citato) *In the place before cited*. L.C. *Lord Chamberlain*. Lord Chancellor. L.C.C. *London County Council*. L.C.J. *Lord Chief Justice*. Ld. *Lord*. L.D. *Lady Day*. Light Dragoons. L.E.F. *Liberté, Égalité, Fraternité* (motto of French Republic). Lev. *Leviticus*. Lex. *Lexicon*. L.F.B. *London Fire Brigade*. L.G. *Life Guards*. L.G.B. *Local Government Board*. L.I. *Long Island*. Light Infantry. Lib. *Liberal*. Librarian. Lieut. *Lieutenant* (also Lt.). Linn. *Linnaeus*. Linnaean. Lit. *Literature*. Literary. Literally. Litt.D. *Doctor of Literature*. L. Lat. *Low Latin*. Law Latin. LL.B. (Legum Baccalaureus) *Bachelor of Laws*. LL.D. (Legum Doctor) *Doctor of Laws*. L. Mus. *Licentiate in Music*. loc. cit. (loco citato) *In the place before cited*. Lon. or Lond. *London*. Lon. or Long. *Longitude*. Lou. *Louisiana*. L.P. *Lord Provost*. Large Paper. Long-playing. L.P.S. *Lord Privy Seal*. L.P.T.B. *London Passenger Transport Board*. L.R.A.M. *Licentiate of the Royal Academy of Music*. L.R.C.P. *Licentiate of the Royal College of Physicians*. L.R.C.S. *Licentiate of the Royal College of Surgeons*. l.s. *Left side*; (locus sigilli) *Place of the Seal*. L.S.C. *London Society of Compositors*. L.S.D. (librae, solidi, denarii) *Pounds, shillings, pence*. Lt. *Lieutenant*. Lt.-Col. *Lieutenant-Colonel*. L.T.A. *Lawn Tennis Association*. L.T.M. *Licentiate of Tropical Medicine*.

M. M. *Marquis*. Metres. *Monsieur*; (mille) *Thousand*; (meridies) *Meridian*, or *Noon*. M.A. *Military Academy*; (Magister Artium) *Master of Arts* (also A.M.). M.A.B. *Metropolitan Asylums Board*. Macc. *Maccabees*. M.Agr. *Master of Agriculture*. Maj. *Major*. Maj.-Gen. *Major-General*. Man. *Manitoba*. Mass. *Massachusetts*. Matt. *Matthew*. M.B. (Medicinae Baccalaureus) *Bachelor of Medicine*. M.B.E. *Member of the Order of British Empire*. M.B.W. *Metropolitan Board of Works*. M.C. *Member of Congress*. Master of Ceremonies. Military Cross. M.C.C. *Marylebone Cricket Club*. M.Ch. *Master of Surgery*. Md. *Maryland*. M.D. (Medicinae Doctor) *Doctor of Medicine*. Mdle. *Mademoiselle*. Me. *Maine*. M.E. *Methodist Episcopal*. Middle English. Military or Mechanical Engineer. Most Excellent. Med. *Medicine*. M.E.G.H.P. *Most Excellent Grand High Priest*. Mem. *Memorandum*, *Memoranda*; (memento) *Remember*. Messrs. (Messieurs) *Gentlemen*. Sirs. *Meth. Methodist*. M.F. *Master of Forestry*. M.F.G.B. *Miners' Federation of Great Britain*. M.F.H. *Master of Foxhounds*. mg. *Milligramme(s)*. Mgr. *Monsignor*. M.I.C.E. *Member of the Institute of Civil Engineers*. Mich. *Michigan*. Michaelmas. Mid. *Middle* (voice). Midshipman. Mil. *Military*. Min. *Minute(s)*. Mineralogy. Min. Plen. *Minister Plenipotentiary*. Minn. *Minnesota*. Miss. *Mississippi*. M.L.A. *Member of the Legislative Assembly*. Mlle. *Mademoiselle*. MM. (Messieurs), *Gentlemen*, *Sirs*, (Their) *Majesties*. Mme. *Madame*. Mo. *Missouri*. Month. Mod. *Modern*. Moderate. M.O.H. *Medical Officer of Health*. Mon. *Monmouth*. Mont. *Montana*. M.P. *Member of Parliament*. M.P.P. *Member of Provincial*

Parliament (Canada). M.P.S. *Member of the Pharmaceutical Society*. M.R. *Master of the Rolls*. M.R.A.S. *Member of the Royal Asiatic Society*, *Member of the Royal Academy of Science*. M.R.C.C. *Member of the Royal College of Chemistry*. M.R.C.P. *Member of the Royal College of Preceptors*, *Member of the Royal College of Physicians*. M.R.C.S. *Member of the Royal College of Surgeons*. M.R.C.V.S. *Member of the Royal College of Veterinary Surgeons*. M.R.I. *Member of the Royal Institute*. M.R.I.A. *Member of the Royal Irish Academy*. MS. *Manuscript*. M.S. (*memoriae sacrum*) *Sacred to the memory of*. M.Sc. *Master of Science*. MSS. *Manuscripts*. Mt. *Mount*, *Mountain*. Mus. *Music*, *Museum*. Mus. Bac. *Bachelor of Music*. Mus. D. or Mus. Doc. *Doctor of Music*. M.V.O. *Member of the (Royal) Victorian Order*. M.W.B. *Metropolitan Water Board*. Myth. *Mythology*.

N. N. *North*, *Note*, *Name*, *Noun*, *Neuter*. N.A. *North America*. N.A.A.F.I. *Navy, Army and Air Force Institutes*. Nat. *Natural*, *Natal*, *National*. Nat. Hist. *Natural History*. N.A.T.O. *North Atlantic Treaty Organisation*. Naut. *Nautical*. N.B. *North Britain*, *North British*, *New Brunswick*; (*nota bene*) *Note well*, or *Take notice*. N.C. *North Carolina*, *New Church*. N.C.O. *Non-commissioned Officer*. n.d. *No date*. N.D. *North Dakota*. N.D.L. *Norddeutscher Lloyd* (*North German Lloyd Steamship Co.*). N.E. *New England*. N.E.A. *National Educational Association*. Neb. *Nebraska*. N.E.D. *New English Dictionary*. Neg. *Negative*. Neh. *Nehe-miah*. nem. con. (*nomine contradicente*) *No one contradicting*. Neth. *Netherlands*. Neut. *Neuter*. Nev. *Nevada*. N.F. *Newfoundland*. N.F.S. *National Fire Service*. N.F.U. *National Farmers' Union*. N.G. *National Guard (U.S.A.)*. N.H. *New Hampshire*, *New Haven*. N.H.I. *National Health Insurance*. N.H.S. *National Health Service*. N.I. *Northern Ireland*. N.J. *New Jersey*. n.l. (*non liquet*) *It appears not*, *The case is not clear*. N.L. or N. Lat. *North Latitude*. N.L.C. *National Liberal Club*. N.M. *New Mexico*. No. (*numero*) *Number*. N.O. *New Orleans*. Nom. *Nominative*. Non-con. *Non-commissioned Officer*. Non-con. *Non-content*, i.e. *dissentient* (*House of Lords*). non obst. (*non obstante*) *Notwithstanding*. non pros. (*non prosequitur*) *He does not prosecute* (a judgment entered against the plaintiff when he does not appear to prosecute). non seq. (*non sequitur*) *It does not follow*. Nor. *Norman*. Nor. Fr. *Norman French*. N.P. *Notary Public*. N.P.D. *North Polar Distance*. N.R.A. *National Recovery Administration (U.S.A.)*. N.S. *Nova Scotia*, *New Style* (after the year 1752), *Numismatic Society*; (*Notre-Seigneur*) *Our Lord*. N.S.I.C. (*Noster Salvator Iesus Christus*) *Our Saviour Jesus Christ*. N.S.J.C. (*Notre Seigneur Jesus-Christ*) *Our Lord Jesus Christ*. N.S.P.C.C. *National Society for the Prevention of Cruelty to Children*. N.S.W. *New South Wales*. N.T. *New Testament*. n.u. *Name, or names, unknown*. N.U.C. *National Union of Clerks*. N.U.J. *National Union of Journalists*. Num. or Num.

Numbers. N.U.R. *National Union of Railwaymen*. N.U.T. *National Union of Teachers*. N.V.M. *Nativity of the Virgin Mary*. N.W.T. *North-West Territory*. N.Y. *New York*. N.Y.K. *Nippur Yusen Kaisha* (steamship company). N.Z. *New Zealand*.

O. O. *Ohio*, *Old*. ob. (*obit*) *Died*. O.B.E. *Officer of the British Empire*. Obs. *Observatory*, *Obsolete*, *Observation*. O.C. *Officer Commanding*. O.E. *Old English*. O.E.D. *Oxford English Dictionary*. O.E.E.C. *Organisation for European Economic Co-operation*. O.F. *Old French*, *Odd Fellows*. O.H.G. *Old High German*. O.H.M.S. *On His (or Her) Majesty's Service*. O.K. *All correct*. Okla. *Oklahoma*. O.M. *Old Measurement*, *Order of Merit*. Ont. *Ontario*. Op. *Opposite*, *Opus*. O.P. *Out of print*, *Opposite Prompter*. op. cit. (*opere citato*) *In the work cited*. O.R. *Other Ranks*. Ore. *Oregon*. o.s. *Out of stock*, *Outstanding*. O.S. *Old Style* (previous to 1752). O.S.B. *Order of St Benedict*. O.S.F. *Order of St Francis*. O.T. *Old Testament*. O.T.C. *Officers' Training Corps*. O.U.D.S. *Oxford University Dramatic Society*. Oxon. (*Oxonla*), *Oxford*; (*Oxonlensis*) *Of Oxford*. Oz. *Ounce(s)*.

P. P. *President*, *Prince*, *Page*, *Participle*. p.a. (*per annum*) *By the year*. P.A. *Press Association*, *Publishers' Association*. P. & O. *Peninsular and Oriental* (Steam Navigation Co.). Pa. *Pennsylvania*. Parl. *Parliament*, *Parliamentary*. part. *Participle*. pass. *Passive*. P.A.T.R.A. *Printing, Packaging, and Allied Trades Research Association*. P.A.Y.E. *Pay as you earn* (income tax). payt. *Payment*. P.C. *Privy Council or Councilor*, *Police Constable*; (*Patres Conscripti*) *Conscript Fathers*. pd. *Paid*. P.E. *Protestant Episcopal*. P.E.I. *Prince Edward Island*. P.E.N. (*Club*) *Poets*, *Playwrights*, *Essayists*, *Editors*, and *Novelists*. Penn. *Pennsylvania*. Pent. *Pentecost*. per ann. (*per annum*) *By the year*. per cent. or per ct. (*per centum*) *By the hundred*. per pro. (*per procuracionem*) *By authority of*, *perp. Perpendicular*. P.G. *Past Grand*, *Paying guest*. Ph.B. (*Philosophiae Baccalaureus*) *Bachelor of Philosophy*. Ph.C. *Pharmaceutical Chemist*. Ph.D. (*Philosophiae Doctor*) *Doctor of Philosophy*. Ph.G. *Graduate in Pharmacy*. Phar. *Pharmacy*. Phil. *Philippians*, *Philosophy*, *Philosopher*, *Philosophical*, *Philemon*. Phila. *Philadelphia*. Phys. *Physics*, *Physiology*. P.I. *Philippine Islands (U.S.A.)*. pk. *Peck*. pl. *Place*, *Plural*. P.L. *Poet Laureate*. P.L.A. *Port of London Authority*. P.L.C. *Poor Law Commissioners*. p.m. (*post meridiem*) *After noon*. P.M. *Prime Minister*, *Postmaster*, *Past Master*, *Past Midshipman*; (*post mortem*) *After death*. P.M.G. *Postmaster-General*. P.N.E.U. *Parents' National Educational Union*. pnx. (*pinxit*) *Painted* (affixed to the painter's name). P.O. *Post Office*, *Postal Order*. P.O.O. *Post Office Order*. pop. *Population*, *Popularity*. Port. *Portugal*. Portuguese. P.O.W. *Prisoner of War*. pp. *Pages*. p.p. *Past participle*, *Post paid*; (*per procuracionem*) *By authority of*.

P.P. Parish Priest, (Pater Patriae) Father of his Country, p.p.c. (pour prendre congé) To take leave. Pph. Pamphlet. P.Q. Province of Quebec, Previous Question. Pr. Priest, Prince, Price. P.R. Prize Ring, Proportional Representation, Porto Rico; (Populus Romanus) The Roman people. P.R.A. President of the Royal Academy. P.R.C. (Post Roman Conditiu) From the building of Rome. Preb. Prebendary. pref. Prefitz, Preface. P.R.I.B.A. President of the Royal Institute of British Architects. Print. Printing, pro tem. (pro tempore) For the time being. Prof. Professor. Prot. Protestant. Prov. Proverbs, Proverbially, Provost, Province, Provincial. prox. (proximo) Next, Of the next month. P.R.S. President of the Royal Society. Ps. Psalm(s). P.S. Permanent Secretary, Private Secretary, Principal Sojourner, Priory Seal; (post scriptum) Postscript. pt. Pint, Payment, Point, Port. P.T.O. Please turn over. pub. Public, Published, Publisher. pub. doc. Public document. P.W.D. Public Works Department. Pxt. (pinxit) Painted.

Q. Q. Question, Query, Queen. Q.B. Queen's Bench. Q.C. Queen's Counsel, Queen's College. q.d. (quasi dicat) As if one should say. q.e. (quod est) Which is. Q.E.D. (quod erat demonstrandum) Which was to be demonstrated. Q.E.F. (quod erat faciendum) Which was to be done. Q.E.I. (quod erat inveniendum) Which was to be found out. q.l. (quantum libet) As much as you please. qm. (quomodo) By what means. Q.M. Quartermaster. Q.M.A.A.C. Queen Mary's Army Auxiliary Corps. Q. Mess. Queen's Messenger. Q.M.G. Quartermaster-General. qn. Queen, Question. Q.P. or q.pl. (quantum placet) As much as you please. qq.v. (quae vide) Which see. qr. Quarter (28 lb.), Farthing, Quire. q.s. Quarter section; (quantum sufficit) A sufficient quantity. Q.S. Quarter Sessions. qt. Quart, quantity. qu. or quar. Quarterly. qu. or q.v. (quære) Query. Quc. Province of Quebec. quos. Question. q.v. (quod vido) Which see; (quantum vis) As much as you will.

R. R. Railway, Road, Rod, Rises, River, Read, Resides; (rex) King; (regina) Queen; (recipe) Take. R.A. Royal Academy or Academician, Royal Artillery, Rear Admiral, Right Ascension, Royal Arch, Royal Arcanum. R.A.C. Royal Arch Chapter, Royal Automobile Club, Royal Armoured Corps. rad. (radix) Root, Radical. R.A.D.A. Royal Academy of Dramatic Art. R.A.E.C. Royal Army Education Corps. R.A.F. Royal Air Force. R.A.M. Royal Academy of Music. R.A.M.C. Royal Army Medical Corps. R.A.O.C. Royal Army Ordnance Corps. R.A.S.C. Royal Army Service Corps. R.A.V.C. Royal Army Veterinary Corps. R.B.A. Royal Society of British Artists. R.C. Roman Catholic. R.C.N.C. Royal Corps of Naval Constructors. R.C.P. Royal College of Physicians. R.C.R. Royal Canadian Regiment. R.C.S. Royal Corps of Signals. R.D. Refer to drawer (banking), Royal Dragons, Rural Dean. R.D.I. Royal Designer for Industry. R.D.S. Royal Dublin Society. R.E. Royal En-

gineers, Royal Exchange, Right Excellent. rec. Receipt, Recipe. Rec. Sec. Recording Secretary. Recd. Received. rept. Receipt. Rect. Rector. Ref. Reformed, Reformer, Reformation, Reference, Referee. Ref. Ch. Reformed Church. Reg. Register, Registrar, Regular. Reg. Prof. Regius Professor. Rem. Remark(s), Remainder. R.E.M.E. Royal Electrical and Mechanical Engineers. rep. Representative, Republic. Report, Reporter. Rev. Revelation, Reverend, Revolution, Review, Revenue, Revise. R.F. Royal Fusiliers; (République française) French Republic. R.F.A. Royal Field Artillery. R.F.U. Rugby Football Union. R.G.A. Royal Garrison Artillery. R.H.A. Royal Hibernian Academy, Royal Horse Artillery. R.H.G. Royal Horse Guards. R.I. Rhode Island. R.I.B.A. Royal Institute of British Architects. R.I.C. Royal Irish Constabulary. R.I.P. (Requiescat in pace) May he (she or they) rest in peace. R.L.S.S. Royal Life Saving Society. R.M. Royal Marines, Royal Mail, Resident Magistrate. R.M.A. Royal Military Asylum, Royal Marine Artillery. R.M.L.I. Royal Marine Light Infantry. R.M.S. Royal Mail Steamer. R.N. Royal Navy. R.N.A.S. Royal Naval Air Service. R.N.D. Royal Naval Division. R.N.R. Royal Naval Reserve. R.N.V. Royal Navy Volunteers. R.N.V.R. Royal Naval Volunteer Reserve. Ro. (recto) Right-hand page. R. of O. Reserve of Officers. R.P. (respublica) Republic. R.R. Railroad. R.R.C. (Lady of) Royal Red Cross. r.s. Right side. R.S.A. Royal Scottish Academy or Academician. R.S.E. Royal Society of Edinburgh. R.S.F.S.R. Russian Soviet Federative Socialist Republic (of U.S.S.R.). R.S.M. Royal School of Mines, Royal Society of Medicine, Regimental Sergeant-Major. R.S.P.B. Royal Society for the Protection of Birds. R.S.P.C.A. Royal Society for the Prevention of Cruelty to Animals. R.S.P.P. Royal Society of Portrait Painters. R.S.V.P. (Répondez, s'il vous plaît) Answer, if you please. Rt. Hon. Right Honourable. rtd. Returned. R.T.R. Royal Tank Regiment. R.T.S. Religious Tract Society. R.V. Revised Version. R.W. Right Worthy, Right Worshipful. R.W.D.G.M. Right Worshipful Deputy Grand Master. R.W.G.R. Right Worthy Grand Representative. R.W.G.S. Right Worthy Grand Secretary. R.W.G.T. Right Worthy Grand Treasurer, Right Worshipful Grand Templar. R.W.G.W. Right Worthy Grand Warden. R.W.S. Royal Society of Painters in Water Colours. Ry. Railway (see also R.). R.Y.S. Royal Yacht Squadron.

S. S. South, Saint, Signor, Second (time), Shilling, Sun, Sets, See, Solo, Singular, Son. S.A. South Africa, South America, South Australia, Salvation Army. Sam. Samuel. S.A.R. Sons of the American Revolution. Sask. Saskatchewan. Sax. Saxon, Sazony. sc. science; (scilicet) To wit, Namely; (sculpit) He (or She) engraved it. S.C. South Carolina; (Senatus Consultum) A decree of the Senate. sch. or schr. Schooner, schol. (scholium) A note. Slav. or Sl. Sclavonic. Scot. Scotland, Scottish. script.

Abbreviations

16

Abbreviations

Scripture, Scriptural. S.C.U.A. *Suez Canal Users' Association.* sculp. or sculpt. *Sculpture.* S.D. *Senior Deacon, South Dakota.* S.D.F. *Social Democratic Federation.* S.E.A.C. *South East Asia Command.* S.E.A.T.O. *South East Asia Treaty Organisation.* sec. *Secretary, Second(s), Section.* Sec. Leg. *Secretary of Legation.* Sen. *Senate, Senator, Senior.* Sep. or Sept. *September, Septuagint.* seq. (sequens or sequente) *The following, The next.* seqq. (sequentes or sequentia) *The following, the next.* Sergt. or Sgt. *Sergeant.* Serj. *Sergeant (law).* S.F. *San Francisco.* sh. *Shilling.* S.H.A.E.F. *Supreme Headquarters, Allied Expeditionary Force.* S.H.A.P.E. *Supreme Headquarters, Allied Powers in Europe.* S.I. *Staten Island (U.S.A.).* sin. *Sine (trigonometry).* sing. *Singular.* S.J. *Society of Jesus.* Skt. *Sanskrit.* Sl. *Slavonic.* S. Lnt. *South Latitude.* S.M. *State Militia, Short Metre, Sergeant-Major; (Sa Majesté) His (or Her) Majesty.* S.M.I. (Sa Majesté Impériale) *His (or Her) Imperial Majesty.* Soc. *Socialist, Society.* S. of S. *Secretary of State.* sol. *Solution.* Sol.-Gen. *Solicitor-General.* SOS (wireless signal of distress). S.O.S.B.W. *Society for the Oversea Settlement of British Women.* Sp. *Spain, Spanish.* Spirit. s.p. (sine prole) *Without issue.* S.P.C.K. *Society for Promoting Christian Knowledge.* S.P.G. *Society for the Propagation of the Gospel.* S.P.Q.R. (Senatus Populusque Romanus) *Senate and People of Rome.* sq. *Square.* sq. cm. *Square centimetre(s).* sq. ft. *square foot (m.).* sq. in. *Square inches.* sq. yd. *Square yard.* S.S. *Sunday School, Saint Simplicius (the mark on the collar of the Chief Justice of England), Steamship.* S.S.C. *Solicitor of Supreme Court.* S.S.R. *Soviet Socialist Republic.* St. *Saint, Street, Stone, Strail.* S.T.D. (Sacrae Theologiae Doctor) *Doctor of Divinity.* ster. or stg. *Sterling.* S.T.P. (Sacrae Theologiae Professor) *Professor of Theology.* subj. *Subjunctive.* subst. *Substantive, Substitute.* suff. *Suffix.* sup. *Superior, Supplement, Superfine, Superlative.* supp. *Supplement.* supt. *Superintendent.* surg. *Surgeon.* Surgery. s.v. (sub verbo) *Under the word or title.* Sw. *Swedish.* Sweden. Switz. *Switzerland.* syn. *Synonym, Synonymous.* synop. *Synopsis.* Syr. *Syria, Syriac.* T. T. *Tenor, Town, Township, Ton; (tutti) All together.* t. & o. *Taken and offered.* T.A. *Territorial Army, Typographical Association.* tal qual. (talis qualis) *Just as they come, average quality.* tan. *Tangent.* T.C. *Thames Conservancy.* T.D. *Teachai Dail (Dail representative).* Ten. or Tenn. *Tennessee.* Tex. *Texas.* text. rec. (textus receptus) *Received text.* T.G.W.U. *Transport and General Workers' Union.* T.H. *Territory of Hawaii (U.S.A.).* Thess. *Thessalonians.* T.H.W.M. *Trinity High Water Mark.* T.N.T. *Trinitrotoluene.* T.O. *Turn over.* Toe H. *Talbot House.* tom. *Tome or Volume.* tonn. *Tonnage.* topog. *Topography, Topographical.* tr. *Translation, Translator, Transpose.* trans. *Transactions, Translated, Translation, Translator.* T.S. *Theosophical Society.* T.U.C. *Trades Union Congress.*

U. U. *Unionist.* U.C. (Urbs Condita) *Year of Rome.* U.C.V. *United Confederate Veterans.* U.D.C. *Urban District Council, Union of Democratic Control.* U.F.C. *United Free Church.* U.K. *United Kingdom.* ult. (ultimo) *Last or of the last month.* U.N.E.S.C.O. *United Nations Educational, Scientific, and Cultural Organisation.* U.N.I.C.E.F. *United Nations International Children's Emergency Fund.* Unit. *Unitarian.* Univ. *University.* Universally. U.N.O. *United Nations Organisation (properly, United Nations).* U.N.R.R.A. *United Nations Relief and Rehabilitation Administration.* U.P.C. *United Presbyterian Church.* u.s. (ut supra, ubi supra) *As above.* U.S. *United States.* United Service. U.S.A. *United States of America.* U.S.N. *United States Navy.* U.S.S. *United States Ship.* U.S.S.R. *Union of Soviet Socialist Republics.* U.S.V. *United States Volunteers.* V. V. *Verb, Verse, Vocation, Volume, Viscount; (vide) See; (versus) Against.* Va. *Virginia.* V.A. *Vice-Admiral, Victoria and Albert Order.* V.A.D. *Voluntary Aid Detachment.* V.C. *Vice-Chancellor, Vice-Chairman, Victoria Cross.* v. def. *Verb defective.* verb. sap. or sat. (verbum satis sapientia) *A word to the wise is enough.* V.G. *Vicar-General; (verbi gratia) For example.* v.i. *Verb intransitive.* vid. (video) *See.* viz. (videlicet) *Namely.* To wit. vo. (verso) *Left-hand page.* V.O. *Victorian Order.* voc. *Vocative.* vol. *Volume.* V.P. *Vice-President.* V.S. *Veterinary Surgeon.* Vt. *Vermont.* v.t. *Verb transitive.* Vulg. *Vulgate.* W. W. West. W'ek. W.A. *Western Australia.* W.A.A.C. *Women's Army Auxiliary Corps.* W.A.A.F. *Women's Auxiliary Air Force.* Wash. *Washington.* W.C.T.U. *Women's Christian Temperance Union.* W.D. *War Department.* W.E.A. *Workers' Educational Association.* w.f. *Wrong fount.* W.F.L. *Women's Freedom League.* wht. *Wharf.* W.I. *West Indies.* Wis. *Wisconsin.* W.L.A. *Women's Land Army.* W. Long. *West Longitude.* W.M. *Worshipful Master.* W.O. *War Office.* Warrant Officer. Wireless Operator. Wp. *Worship.* W.P. *Weather permitting.* W.R.A.C. *Women's Royal Army Corps.* W.R.A.F. *Women's Royal Air Force.* W.R.N.S. *Women's Royal Naval Service.* W.S. *Writer to the Signet.* wt. *Weight.* W.T.S. *Women's Transport Service.* W. Va. *West Virginia.* W.V.S. *Women's Voluntary Services.* Wyo. *Wyoming.* X. X. or Xl. *Christ.* Xm. or Xmas. *Christmas.* Xn. or Xtian. *Christian.* Xnty. *Christianity.* Y. Y. Year. Y.B. *Year-book.* yd. *Yard.* *y^s. *The, Thee.* *yth. *Them.* Y.M.C.A. *Young Men's Christian Association.* *yth. *Then.* Y.P.S. *Young People's Society.* *yth. *Their.* yr. *Your.* Year. *y^s. *This.* *yt. *That.* Y.W.C.A. *Young Women's Christian Association.* *yth The Y is a corrupt representation of the A.-S. p, or th. For Classical A., see Graevius's *The-saurus Antiquitatum* (1694), Mommsen's *Corpus Inscriptionum Latinarum* (1863); Alph. Chassant's *Paléographie* (1854), and Campelli's *Dizionario di Abbreviature*

(1899). See also DIPLOMATICS and PALAEOGRAPHY.

Abbreviator is more particularly used for an officer of the Court of Rome, appointed as assistant to the vice-chancellor for drawing up the pope's briefs and reducing petitions, when granted by the pontiff, into proper form for being converted into bulls. The A.s are supposed by Ciampini to be the successors either of the *cellarii* of the imperial household or of the 7 *notarii* said to have been placed by Pope Clement I in the 7 quarters of Rome, to write down the acts of the martyrs within their sev. dists. They are said to have taken their name either from their writing the *brevia* or shorter epistles of the pope, or from making use of notes or abbreviations in writing. A. is also a name given by some authors to an auct. literary academy supposed to have existed at Rome in the 15th cent. and composed of the chief men of letters of the age, as Pomponius Laetus, Platinus, Pontanus, Sannazarius, Sabellicus, etc., who, by the rule of the society, latinised their names as a condition of their admission. The existence of such an academy is doubtful.

Abbt, Thomas (1738-66), Ger. writer, b. Ulm. In 1760 he became prof. of philosophy at Frankfurt. He was the friend of Lessing and Moses Mendelssohn, and contributed to the *Literaturbriefe*. In 1761 he wrote *Vom Tod fürs Vaterland*, a fine expression of his patriotism; in 1763 followed *Vom Verdienst*, a treatise in favour of the education of the people.

Abd-el-Kader (1807-83), Algerian patriot and hero of the long struggle against the French. This he commenced at Oran in 1833, and with varying fortune sustained till he surrendered to Gen. de Lamoricière in 1847. He displayed great skill and perseverance in his conduct of the campaign, and in 1834 he compelled the Fr. Gen. Desmichels to recognise his authority in a treaty. On a resumption of hostilities he inflicted a serious defeat on a large Fr. army at Makta, but he was driven to seek refuge in Morocco in 1843. He became Amir of Mascara in 1832. After his final capture he was released by Louis Napoleon in 1852, and received a pension of 100,000 francs. In retirement at Damascus he wrote a book on the consolations of philosophy under the title *Rappel à l'intelligent: avis à l'indifférent*, 1858, and supplied commentaries to N. J. E. Dumas's *Cherchez du Sahara*, 1858. See A. Bellemare, *Abd-el-Kader*, 1863, and C. H. Churchill, *Life of Abd-el-Kader*, 1867.

Abd-el-Krim (1881-), leader of Rifs in the Moroccan campaigns, 1921 and 1925. The son of a tribal chieftain, and a man with some pretensions to culture, he was, in the heyday of his brief career of military adventure, an able leader and an adept in the arts of intrigue. During the First World War he was in the Sp. service and engaged in helping the Sp. authorities to consolidate their hold on their treaty zone. Later, however, he turned against his Sp. masters and strove to incite the Rifs against the invader.

So successful was he in the field, notably near Melilla, where he almost exterminated an army of some 20,000, that he produced an upheaval in Spain, with the result that a military dictatorship was estab. to cope with the situation. In 1925 he launched an offensive against the Spaniards, this really being his only course when the French had joined the latter. Previously Gen. Primo de Rivera, the Sp. dictator, had offered to make peace on terms very favourable to the Rifs, but the offer was refused by A.-el-K., who wanted nothing less than complete independence. Ultimately he was forced to abandon the struggle through the defections of the tribesmen, who, though unbeaten in their inaccessible fastnesses, had grown tired of fighting, and in May 1926 he surrendered unconditionally to the Fr. Moroccan commander at Fez and was exiled to the Mascarene Is. When being brought to France in 1947 he escaped to Egypt, and in May 1957 was living in Cairo.

Abd-el-Rahman, or **Abd-ur-Rahman** (fl. 732), Moorish chief, invaded Gaul in 731 at the head of the largest Mohammedan army which had yet menaced Christendom. He was defeated and slain by Charles Martel at Tours in 732. **Abd-el-Rahman I** founded in 755 at Cordova the Omayyad dynasty of Sp. caliphs. The second caliph of this name, 822-52, was a great patron of learning; under the third, 912-61, the Cordova caliphate attained its most brilliant period.

Abd-ur-Rahman (1778-1859), Sultan of Morocco, reigned from 1823 to 1859. Much of his time was occupied in putting down internal insurrection. It was during his reign that the practice was abandoned of European states paying a tribute for protection against the piracy of the Moors.

Abd-ur-Rahman Khan (either 1830 or 1844-1901), Amir of Afghanistan from 1880. Supported successfully for a while the claim of his father, Afzal, against his uncle, Sher Ali, but in 1868 had to take refuge in Russian Turkestan. Finally he overcame the son of Sher Ali, Yaqub Khan, and firmly estab. himself as amir. He was eminently friendly to Great Britain, and did much to consolidate his power and to promote the social welfare of his country.

Abdalatif (**Abdu'l Latif**) (1162-1231), Arabian physician and writer, b. Bagdad. Held professorships at Mosul, Damascus, and Cairo, and at the latter place wrote in 1203 a *Compendium of the History of Egypt*. The titles of 166 works by A. have been recorded, about one-fourth of which are on medical subjects.

Abdallah III, see AL-MAMUN.

Abdel-Khalek Pasha Sarwat, see EGYPT.

Abdera, see ADRA.

Abdera, tn in Thrace, the bp. of the philosopher Democritus and the sophist Protagoras; nevertheless its inhab. had a reputation for stupidity, and 'Abderite' became a term for a simpleton.

Abdication, voluntary renunciation of an office by a ruler or sovereign. In a

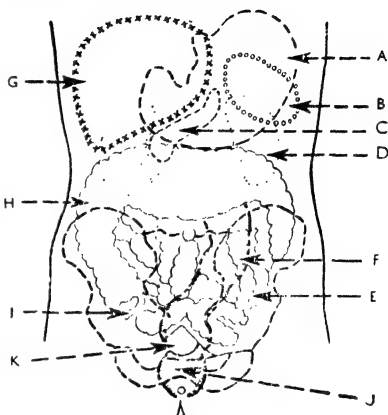
few striking instances office has been relinquished owing to a desire for the freedom of private life, as was the case with the Rom. dictators Cincinnatus, 438 BC, Sulla, 80 BC, and the Rom. emperor Diocletian, AD 305. Philip V of Spain, who abdicated (1724) in favour of his son, resumed the regal functions after his son's death. Other notable A.s in more modern times are Isabella II of Spain, 1870; Amadeus I of Spain, 1873; Prince Alexander of Bulgaria, 1886; Milan of Serbia, 1889; Oscar of Norway, 1905; Abdul Hamid II of Turkey, 1909; Manoel of Portugal, 1910. The emperor Pu-yi of China not only abdicated (1912), but by a final decree converted China from an absolute autocracy into the largest rep. in the world. According to Blackstone, no Eng. sovereign may abdicate without the consent of parliament. This was done in the case of James II (1688), who was declared by a joint sitting of both houses to have abdicated.

The most important A.s during or after the two world wars were Nicholas II of Russia, 1917 (*see RUSSIA, History*); Constantine of Greece, 1917 (restored 1920), abdicated finally 1922; Ferdinand of Bulgaria, 1918; William II of Germany, 1918; Nicholas of Montenegro left his country in 1916 and was dethroned in 1918; Karl of Austria, 1918; Mohammed VI of Turkey, 1922; George II of Greece, 1924 (restored 1936); Hussein, King of the Hejaz, 1924; Ali, King of the Hejaz, 1925; Amanullah of Afghanistan, 1929; Michael of Rumania, 1930 (restored 1940) and 1948; Alfonso XIII of Spain, 1931; Prajadhipok of Siam, 1935; Edward VIII of Great Britain, 1936; Zog I of Albania, 1939; Charles II (Carol) of Rumania, 1940; Peter II of Yugoslavia, 1945; Simeon of Bulgaria, 1946; Victor Emmanuel III of Italy, 1946; Umberto II of Italy, 1946; Wilhelmina of the Netherlands, 1948; Leopold III of Belgium, 1951; Talal I of Jordan, 1951; Farouk of Egypt, 1952; Ahmed Fouad II of Egypt, 1953.

Abdomen, that part of the body separated from the thorax by the diaphragm, enclosed by the lower ribs and the muscles of the belly, and supported by the pelvis. The diaphragm is a partition of membrane and muscle with a movement determining the action of the lungs in breathing. The whole abdominal cavity is lined by a membrane called the peritoneum (q.v.). The term abdominal cavity lends itself to a possible misunderstanding, as it is most economically packed with a number of organs which are concerned in the nutrition of the body, and which are kept in their relative positions by the muscles of the abdominal wall and the bands of the visceral peritoneum. When for any reason there is a gap in the muscles of the abdominal wall part of the contents of the A. are liable to protrude, giving rise to a hernia, or rupture (q.v.).

The stomach (q.v.) is situated in the upper part of the A., with the liver in front and the kidneys, pancreas, and spleen behind. From the stomach the intestines (q.v.), with a total length of

about 30 ft., lead to the anus. The organs occupying the pelvic cavity, the lower part of the A., are the rectum and bladder in the male and the rectum, bladder, uterus, ovaries and their appendages in the female. *See also under* the appropriate headings for the individual abdominal organs.



REGIONS OF THE ABDOMEN

A, stomach; B, spleen; C, pancreas; D, kidney; E, small intestine; F, descending colon; G, liver; H, large intestine; I, appendix; J, rectum; K, bladder.

Abduction. In ancient legal codes the word implied the unlawful taking away of a free person, or a slave of another person. Under the Rom. criminal law the word *plagium* stood for the buying of a free person, and the term is still used in Scotland for the theft of a child. In Eng. law, A. technically means the taking away by force, fraud, or persuasion of a woman (or child) against her own will, or, if the woman be under 21, against the will of her parents or guardians. The term is also applied under the Corrupt and Illegal Practices Act, 1883, to the action of preventing the free exercise of the franchise of any elector. The common forms of the crime are defined by the Criminal Law Consolidation Act, 1861, and the crime is also dealt with in the Criminal Law Amendment Act, 1885. The more serious forms of the offence, the A. of women, are held to be a felony, and the heavy penalty of 14 years' imprisonment may be inflicted. It is also a misdemeanour punishable by a term of 2 years' imprisonment to take a girl under 18 for the purpose of seduction, provided there were no reasonable grounds for supposing the girl to be above 18. The A. of children under 14 is technically called 'child-stealing', and is an offence punishable by a maximum term of 14 years' imprisonment, but the mother of a child or the father of an illegitimate child cannot be

indicted. A. must not be confused with *kidnapping* (q.v.). The latter includes the theft of any person, but is more properly applied to taking away beyond the seas—so that the person loses the protection of his country's laws. Throughout the U.S.A., A. is a felony, and in some states is punishable by a fine, not exceeding \$10,000, in others by solitary confinement at labour for a term not exceeding 25 years.

Abdul-ahi-el-Taachi, or **Abdullahi ibn sayid Mohammed** (c. 1850–99), 'Khalifa,' follower of the Mahdi, Mohammed Ahmed, succeeded him in 1885. He was defeated by Kitchener at Omdurman in 1898, and killed at the battle of Om Debrikat in 1899.

Abdul Aziz (III of Nejd) **ibn Sa'ud**, see SA'UD.

Abdul-Aziz (1830–76), Sultan of Turkey, succeeded his brother, **Abdul-Medjid**, in 1861. His reign was one long struggle against rebellion in Turkey's European provs., and he is remembered chiefly for his extravagance and bad gov. He was deposed on 30 May 1876, and found dead 4 days later.

Abdul-Hamid I (1725–89), Sultan of Turkey, came to the throne in 1773. His reign was signalised by Turkey's struggle with Russia and Austria. The former wrested from him suzerainty over the Crimea in 1774, and the latter inflicted a crushing defeat on him at the battle of Ochakov (1788).

Abdul-Hamid II (1842–1918), Sultan of Turkey, succeeded in 1876, on the deposition of his brother, Murad V, and was himself deposed in 1909. His reign included wars with Serbia (1876), Russia (1877–8), Greece (1897). The Armenian atrocities (1894–6) earned him the titles 'Great Assassin' (Gladstone) and 'Abdul the Damned' (poem by Sir Wm Watson). The revolution of the 'Young Turks' under Enver Bey which deposed him estab. the beginnings of parl. gov. in Turkey.

Abdul Latif, see ABDALATTIF.

Abdul-Medjid (1823–61), Sultan of Turkey, succeeded to the throne (1839) 8 days after the disastrous defeat of his father's (Mahmud II) army at Nisib by Mehmet Ali, the rebellious viceroy of Egypt. The intervention of the Christian powers checked the advance of the victorious Egyptians on Constantinople, and thus saved A.-M.'s dynasty. The treaty of 1841, imposed on both parties by the European powers, settled the relationship of Egypt and Turkey. This sultan instituted many reforms, the status of Christians being considerably improved. The Crimean War took place during A.'s reign.

Abdullah el Hussein (1882–1951), 1st King of Jordan (formerly Transjordan), b. Mecca, second son of the sherif Hussein ibn Ali (later King of the Hejaz) and brother of Faisal, King of Iraq (q.v.). After fighting against the Turks during the First World War, he arrived in Transjordan in 1921 and was allowed by the Brit. Gov. to estab. himself there as emir. In 1928 his position was formally

recognised as independent ruler of Transjordan under Brit. mandatory rule. He received an ann. subsidy from the Brit. Gov. On 22 Mar. 1946 the mandate was abrogated, and by a new treaty of alliance with Britain Transjordan became an independent kingdom with A. as its first king. A. now had under his control the Arab Legion (raised in 1922 by Peake Pasha), which, under Brit. training and leadership, was the best Arab military force in the Middle E. As a result of the Palestine war of 1947–8, A. was able to annex Arab Jerusalem and most of that part of Palestine assigned to the Arab State by the U.N.'s resolution of 1947. He thus aroused the hostility of the Arab League (q.v.). In 1949 he assumed the title of King of Jordan. On 20 July 1951 he was assassinated by a member of the Jihad faction. His memoirs were pub. in English in 1950, ed. by P. P. Graves. See also JORDAN; TRANSJORDAN; PALESTINE.

Abdullahi ibn Seyid Mohammed, see ABDUL-AHL-EL-TAACHI.

Abecedarians, name (derived from A B C) of small sect consisting of followers of Storch (1522), the Ger. Anabaptist. Holding that only a knowledge of the Scriptures communicated by the Holy Spirit direct was necessary, they refused to learn to read.

Abel ('breath' or 'vapour'), second son of Adam (Gen. iv), was a shepherd. Because he offered to God a more acceptable sacrifice than that of his brother Cain, the latter slew him in a fit of jealousy. This was the first death, the first murder, and the first martyrdom.

Abel (d. 764), Archbishop of Rheims; a native of England or Ireland, he aided St Boniface in missionary work in Germany. He was never able to take possession of his see and died abbot of Lobbes.

Abel, **Sir Frederick Augustus** (1827–1902), authority on explosives, sharing with Sir James Dewar (q.v.) the credit for inventing cordite. He also invented a close-test apparatus for ascertaining the flash-point of petroleum. He began his career as prof. of chem. at the Royal Military Academy (1851–5), and was afterwards appointed chemist to the war dept (1854–8). He was the first director of the Imperial Institute, being appointed in 1887, and pub. many important works on gunpowder and other explosives. His introduction of pulping was an important step towards making the manu. of gun-cotton safe. He developed the heat test for explosives.

Abel, **Karl Friedrich** (1723–87), Ger. musician and composer, b. Cöthen. He played on the viola da gamba. Originally in the court band at Dresden, he came to England in 1759 and became one of the queen's chamber musicians. He joined Johann Christian Bach in giving concerts in London, where he died.

Abel, **Niels Henrik** (1802–29), Norwegian mathematician, b. Findö, son of a clergyman. Entered univ., Christiania, 1821, and later became a lecturer there. Is chiefly known for his develop-

ment of the theory of elliptical functions and algebraic equations, and he proved that an algebraic solution of the quintic was impossible. The name of Abelian functions has been given to the higher transcendents of multiple periodicity which he was the first to discuss. In 1825 the gov. gave him an allowance to enable him to travel, and after his premature death from consumption they pub. his works.

Abélard, Pierre (1079–1142), Fr. scholastic philosopher and theologian, b. Pallet, near Nantes; studied under Roscelin and Wm of Champeaux (q.v.) in Paris. Having scored some success over the latter in debate, he was obliged to leave Paris and subsequently opened a school of his own, first at Melun, then at Corbeil, and finally became head of the school at St Geneviève. A. next went to Laon where he attended the theological lectures of St Anselm and again gave proof of exceptional ability. He returned to Paris, was made a canon of Notre-Dame (1115), and set up another school in which there were trained a future pope, 19 future cardinals, and more than 50 future bishops. A. now had the misfortune to fall in love with Héloïse, the niece of Canon Fulbert; a son was born, and the pair were secretly married soon afterwards. When this fact became known, Héloïse retired to a convent at Argenteuil. Fulbert revenged himself by having A. castrated by a band of ruffians. The victim recovered and became a monk at St Denis, while Héloïse took the veil at Argenteuil. In 1120 A. was persuaded to open a theological school at Maisoncelle, but it was not long before his *Introduction to Theology* raised suspicions of unorthodoxy. A provincial synod held at Soissons (1121) condemned his teaching, ordered the work to be burned, and confined him in the Abbey of St Médard. On his release A. returned to St Denis and infuriated the community by denying the tradition that their monastery had been founded by Denis the Areopagite. He withdrew to the countryside near Nogent-sur-Seine and built a little oratory of wicker; but students flocked to him in thousands and rebuilt the chapel in stone. This was the famous Paraclete, so named in gratitude for the comfort given by his friends. Driven from here by relentless enemies, A. spent ten years as superior of the monastery of St Gildas de Rhuys in Brittany, establishing Héloïse as head of a new convent at the now deserted Paraclete. After leaving St Gildas, he wrote a number of works, including *Historia Calamitatum*, which drew from Héloïse three famous letters. His theological writings, however, were denounced by St Bernard of Clairvaux at the Council of Sens (1141). A. appealed to Rome; but the council condemned his works notwithstanding, and the Holy See confirmed their judgment. A. set out to plead his cause before the Pope in person. Sickness, however, obliged him to abandon his journey at Cluny where he was received by the abbot, Peter the Venerable. When his suffering increased he

was moved to the priory of St Marcel near Châlon-sur-Saône, where he d. Héloïse lived until 1164, and was buried at A.'s side. In 1497 their ashes were moved into the priory church; in 1800 to the garden of the Musée Française at Paris; and in 1817 to the cemetery of Père Lachaise.

The philosophy of A. was opposed to both Realism and Nominalism (q.v.). He maintained that universals obtain reality by being predicated of things; but this view, known as Conceptualism (q.v.), tended too much towards Nominalist materialism and hence incurred the censure of the Church. The physical sufferings of A., and the aura of romance which hangs about his love for Héloïse, have tended to obscure his intellectual no less than his moral weakness. His ability is not called in question; but it lacked the virtues of humility and self-discipline which are the prerequisites of philosophical approach to revealed truth.

A.'s works have been ed. by V. Cousin (2 vols.), 1849–59. See C. de Rémusat, *Abélard* (2 vols.), 1845; J. G. Sikes, *Peter Abélard*, 1932; E. Gilson, *Héloïse et Abélard*, 1938; M. H. Carré, *Realists and Nominalists*, 1946.

Abele, Eng. name of the *Populus alba*, or white poplar. See **POPLAR**.

Abelia, genus of evergreen and deciduous shrubs, family Caprifoliaceae, hardy in S. England; the Chinese *A. chinensis*, *A. schumannii*, and the Mexican *A. floribunda* being esteemed for their summer and autumn flowers.

Abelin, Johann Philipp (c. 1600–c. 1634), Ger. historian, better known under his pseudonym of Johann Ludwig Gottfried, b. Strasburg. His writings, all pub. at Frankfurt, include vols. i and ii of *Theatrum Europaeum* (21 vols.), 1633–1738, *Historia Orientalis Indiae*, 1628, and *Inventarium Sueciae*, 1632.

Abell, John (1653–1724), singer, lutenist, and composer, b. Aberdeenshire. He settled early in London, worked at various places in Germany, and returned c. 1700. He d. at Cambridge.

Abellinum, see **AYELLINO**.

Abencerrages, name of a noble family in the Moorish kingdom of Granada, the story of whose long struggle with the rival family of the Zegriss has been the theme of many Sp. chroniclers and romance writers. According to tradition the leading members of the A. were eventually massacred in the Alhambra by Boabdil in the 15th cent.

Abenezra (c. 1093–1167), a celebrated Jewish scholar, b. Toledo, who lectured and pub. works on philosophy, grammar, medicine, mathematics, and astronomy, and in connection with the last-named science gave his name to a star. He is chiefly known for his great commentary on the O.T.

Abensberg, Ger. tn in the *Land* of Bavaria (q.v.), 47 m. N. by E. of Munich (q.v.), on the A. riv., a trib. of the Danube (q.v.). It has anct fortifications and an abbey-church. Pop. 4000.

Abeokuta, tn in S. Nigeria, cap. of the

area of the same name, 50 m. from Lagos. Constituted in 1914, it was previously the centre of a semi-independent native state. It was founded in 1825 by the inhab. of many neighbouring vills. to protect themselves from slave-hunters. The Yorubas who belong to A. are very politically conscious and can be intractable. They are keen traders and a highly intelligent people. Area of the prov. 4266 sq. m.; pop. 84,000.

Aber, Celtic word meaning 'mouth of river,' which forms the prefix of many names of places in Great Britain.

Aber, small vil. in Caernarvonshire, N. Wales, with noted waterfalls. Pop. 400. **Aberavon**, see PORT TALBOT.

Aberayron, small watering-place in Cardigan, Wales. Pop. 1100.

Aberbrothook, see ARBROATH.

Abercarn, urb. dist. in Monmouthshire, England, with collieries and tinplate works. Pop. 18,800.

Aberconwy, see CONWAY.

Abercorn, Duke of, Irish title held by the family of Hamilton (q.v.). James Hamilton, a Scottish nobleman, was made baron, 1603, an earl in 1606, and in 1790 his descendant became a marquess. In 1868 the 2nd marquess was made a duke and became Lord-Lieutenant of Ireland. His family is portrayed in Disraeli's *Lothair*. James, the 2nd duke (1838-1913), was chairman of the Brit. S. Africa Co.; James, the 3rd duke (b. 1869), was Governor of N. Ireland, 1922-1945.

Abercorn, N. Rhodesia, is near the S. end of Lake Tanganyika. On 25 Nov. 1918 the Ger. troops surrendered to the British here. Broken Hill, 595 m., is the nearest railway station. A. is beautifully situated in a healthy climate and fertile country.

Abercrombie, John (1726-1806), a writer on horticult. subjects, employed at Kew Gardens. In 1767 he pub. *Every Man his own Gardener*, which is said to have been submitted to Goldsmith for purposes of literary revision and returned without any alteration.

Abercrombie, John (1780 - 1844), physician, b. Aberdeen. He graduated M.A. Aberdeen, 1803, and M.D. Edinburgh, where, at a later date, he was appointed surgeon to the Royal Public Dispensary. He rapidly developed a large practice among rich and poor and worked this with a number of apprentices. A. became famous as a teacher and was responsible especially for the introduction of the systematic teaching of pathological anatomy, a subject in which he particularly distinguished himself. A. was appointed physician to the king in Scotland (1828) and was lord rector of Marischal College, Aberdeen (1835). In addition to treatises on the pathology of the nervous system and on other medical subjects he was the author of 2 works that had considerable vogue at the time. These were *Inquiries Concerning the Intellectual Powers*, 1830, and *Philosophy of the Moral Feeling*, 1833, in which he sought to harmonise the facts of science with the revelations of religion.

Abercrombie, Lascelles (1881-1938), poet and scholar, b. Ashton-upon-Mersey. He was educ. at Malvern and Owens College, Manchester. His first vol. of verse, *Interludes and Poems*, appeared in 1908 and was followed by *Mary and the Bramble*, 1910, and *Emblems of Love*, 1912, as well as sev. plays which included *The Sale of St Thomas*, 1911, and *Deborah*, 1913. After the First World War he was appointed lecturer in Eng. at Liverpool, then held the Chairs of Eng. at Leeds, 1922-9, and London, 1929-35, finally becoming Goldsmith's Reader in Eng. at Oxford and a fellow of Merton College. His later pubes. include *Four Short Plays*, 1922, *Phoenix*, 1923, and *Twelve Idylls*, 1928; *Collected Poems* appeared in 1930. His poetry is complex and generally dramatic in form. Among his critical works are a study of *Thomas Hardy*, 1912, *The Epic*, 1914, *Principles of English Prosody*, 1924, *The Idea of Great Poetry*, 1925, *Romanticism*, 1926, and *Poetry: Its Music and Meaning*, 1932.

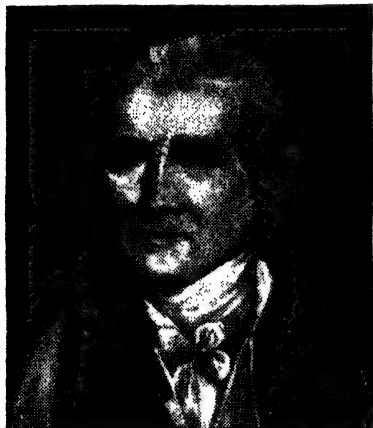
Abercrombie, Sir (Leslie) Patrick (1879-1957), architect and town planner, b. Ashton-upon-Mersey. Prof. of Civic Design, Liverpool Univ., 1915-35; Prof. of Town Planning, London Univ., 1935-46. Author of *Town and Country Planning*, 1933, and other books. Won the competition for replanning Dublin in 1913. With J. H. Forshaw, prepared for the L.C.C. *The County of London Plan*, 1943. This was followed by *The Greater London Plan*, 1944, in which many other persons collaborated under his direction. The purpose of both reports was to improve means of transport, distribution of pop. and industry, conditions of housing, and provision of open spaces, etc., with regard for the welfare of the people and the preservation or creation of amenities. Both reports were very comprehensive and detailed, illustrated on a scale never attempted previously. Other tns and areas for which he prepared plans include Edinburgh, Plymouth, Hull, the W. Midlands, Clydeside, and Bournemouth.

Abercromby, David (d. 1702), Scottish physician and metaphysician of the 17th cent., of whose life little is known save what he himself has told in his book, *Protestancy to be Embraced*, 1682. He was educ. as a Rom. Catholic, and lived for 18 years with a Fr. Jesuit order, but he finally embraced the Protestant faith.

Abercromby, Patrick (1656-1716), antiquary and historian, b. Forfar. Educ. at St Andrews, he was physician to James II. He wrote pamphlets against the Union of 1707 and a hist., *Martial Achievements of the Scots Nation*, 1711-1716.

Abercromby, Sir Ralph (1734-1801), general, b. Menstry, Clackmannanshire. He was educ. at Rugby, and studied law at Edinburgh and Leipzig. He joined the army, accompanied the Duke of York on the two disastrous campaigns against the Fr. in Holland (1793 and 1799), and by his skilful administration and humanity gained the affection of the whole army.

On 18 Feb. 1787 Chacon, Sp. governor, surrendered Trinidad to A. without a fight, and the cession was confirmed by the treaty of Amiens, 1802. He was wounded



National Portrait Gallery
SIR RALPH ABERCROMBY
Painting after John Hoppner.

during an engagement with the Fr. at Alexandria, Egypt, and, though victorious, *d.* from his wounds a week later.

Aberdare, Henry Austin Bruce, 1st Baron (1815-95), statesman, *b.* Dufryn, Glamorganshire. He was Liberal M.P. for Merthyr from 1852, and held sev. political appointments, including the home secretaryship, 1868-73, and the Presidency of the Council, 1873-4. A. was made a baron in 1873 and was the first chancellor of the univ. of Wales, 1894.

Aberdare, tn and urb. dist. of Glamorganshire, S. Wales, 20 m. N. of Cardiff at the confluence of the Dare and the Cynon. Once an important coal-mining tn, it is now largely concerned with light industries estab. on the Hirwaun Trading Estate (NW. of A.). Electric cables and metal products are also manuf. Pop. 40,916.

Aberdeen, George Hamilton Gordon, 4th Earl of (1784-1860), statesman, *b.* Edinburgh and educ. at Harrow and Cambridge. He succeeded to the earldom in 1801. A. was ambas. at Vienna (1813), and signed the treaty of Teplitz. He then entered political life as a Tory, and became successively chancellor of the duchy and foreign secretary in Wellington's Cabinet (1828-30), but although he held office (colonies and war) under Peel (1834-5) and was again foreign secretary (1841-6) he resigned with Peel in 1846. In 1852 he succeeded Lord Derby as Prime Minister, forming a popular coalition ministry. His ministry soon met with disfavour owing to the

mismanagement of the Crimean War, and he resigned after a motion of censure against his gov. had been carried in the House of Commons. *See* life by Lady Frances Balfour, 1923.

Aberdeen, Sir John Campbell Gordon, 1st Marquess and 7th Earl of (1847-1934), grandson of 4th earl, educ. at St Andrew's and Oxford. He succeeded his brother to the earldom in 1870. He was twice Lord-Lieutenant of Ireland (1896 and 1905-15), and was Governor-General of Canada, 1893-8. He was created marquess, 1916.

Aberdeen, N. co. of Scotland, bounded N. and E. by the N. Sea, S. by the cos. of Kincardine, Angus, and Perth, and SW. and W. by Inverness and Banff. The ruins of sev. old feudal castles still exist, among which may be noted Dundargue, Ken-Edgar, Craigston, Fedderssett, Slains, and Fyvie. Balmoral Castle is the favourite royal residence in the highlands. The coastline of A. is fairly regular, but there are points and headlands towards the NE. (Buchan Ness is the most easterly point of Scotland). Farther N. there are high rocks and caves. In the SW. the co. is bounded by the Grampians (q.v.), which in their highest peaks rise to over 4000 ft. Ben Macdui, Cairntoul, Braeriach, and Lochnagar are the prin. heights. The surface of the co. is generally hilly, and A. is watered by the R.s. Dee, Don, Uthan, Ugie, and Deveron. The soil on the whole is not fertile except in that portion of the co. between the R.s. Don and Uthan, but by the exertion of the farmers crops of barley, oats, and turnips are produced. Much of the land is covered with fr. ash, birch, and poplar trees. Sheep and cattle are reared and A. is noted for the breeding of pedigree cattle. Herring and salmon fishing is an important industry, particularly at Peterhead and Aberdeen. The co. is divided



LORD ABERDEEN, FOURTH EARL

into 5 parts: Mar, Formartine, Strathbogie, Buchan, and Garioch. The most important tns are Aberdeen, one of the prin. Scottish ports, Peterhead, Fraserburgh, Inverurie, and Huntly, and there are many small vils. The co. returns 2 members to Parliament. Area 1927 sq. m.; pop. 323,000.

Aberdeen: 1. Important city, royal burgh, port, and holiday resort of N. Scotland, situated between the mouths of the R.s Dee and Don, cap. of Aberdeen co. and a co. of itself. In 1179 William the Lion

College, founded 1593 by George Keith, Earl Marshal of Scotland, in New A. Famous Aberdonians include John Barbour, the poet (c. 1320-95), who was archdeacon of A. from about 1356 until his death; Hector Boece (c. 1465-1536) the Scottish historian and principal of King's College; and George Campbell, the Scottish theologian (1719-96), a principal of Marischal College. Byron received his early education at the grammar-school. A. carries on an extensive trade of which the ann. value runs into millions of



Corporation of the City of Aberdeen

THE MUNICIPAL BUILDINGS, ABERDEEN

granted A. a charter and it became a royal burgh, but was burned in 1336 by Edward III. Rebuilt as New A., it became a flourishing tn. The buildings of this beautiful city are largely of granite; among the more imposing are the municipal buildings, the market hall, the art gallery, the grammar-school, the Royal Infirmary, the trades hall, and Marischal and Gordon's Colleges (the former a college of the univ. of A., the latter a boys' public school). Among the places of worship are the church of St Nicholas, the Rom. Catholic cathedral, St Andrew's Cathedral, and St Machar's Cathedral in Old A. (this dist. is now incorporated in the municipality). The univ. of A. comprises 2 constituent colleges: King's College, founded in 1494 by Bishop Elphinstone in Old A., and Marischal

pounds; and ships ply between A. and other Brit. ports, America, the E. and W. Indies, and Baltic and Mediterranean ports. There are extensive docks and a large fish market; the chief industries are white and salmon fishing, shipbuilding, paper-making, engineering, granite-working, comb-making, quarrying, and the manuf. of linen and woollen goods. In recent years the ann. value of fish landed has exceeded £2,000,000, while A. trawlers did good service as mine-sweepers and patrols in both world wars. A. is governed by a council of 37 members, and as a parl. bor. returns 2 members to the House of Commons. Pop. 182,714.

2. Cap. of Brown co., S. Dakota, U.S.A. It is a rail and wholesale distribution centre, and produces farm machinery, wood products, dairy produce, flour,

wheat, barley, oats, and corn. It has a state teachers' college, a hospital, and an airport. Pop. 21,050.

3. Tn in Chehalis co., Washington, U.S.A.; it has saw-mills and machine shops, and there are fishing and fish-canning industries. Pop. 19,653.

Aberdeen Angus Breed, see CATTLE.

Aberdeen Terrier, see SCOTTISH TERRIER.

Aberdevine, see SISKIN.

Aberdovey, seaside resort of Merioneth, Wales, on the estuary of the R. Dovey, in Cardigan Bay, part of Towyn (q.v.) urb. dist. Pop. 1500.

Aberfeldy, burgh on the r. b. of the R. Tay in Perthshire, Scotland. The scenery around, referred to by Burns in *The Birk of Aberfeldy*, is very beautiful, the falls of Moness being a great attraction. Pop. 1560.

Aberfoyle, vil. of Perthshire, Scotland, on the R. Forth, nearest vil. to the Trossachs (q.v.). Pop. 1200.

Abergavenny, tn in Monmouthshire, at the confluence of the Usk and Gavenny. It is an old Rom. settlement (Gobannium); there are remains of an old castle and of a Benedictine priory, and it has an old church and sev. other places of worship. Coal and iron are found in the vicinity, but it is chiefly noted as a wool market. Pop. 8844.

Abergeldie Castle, royal seat in Aberdeen co., situated on the R. Dee near Balmoral.

Abergele, tn and coastal resort of Denbighshire, N. Wales, formerly the township of the lordship of Denbigh (estab. 1282). The narrow defile of Tan-y-Ogo (2 m. W.) is the site of the battle between Harold and Gruffydd ap Llewellyn. A Brit. vil. (3rd cent. AD) has been excavated above modern St George (1½ m. E.). Pop. 7500.

Aberhart, William (1878-1943), Canadian politician, b. Ontario and educ. at Queen's Univ. Principal at high school in Calgary, Alberta. Organised a social credit movement, which won the prov. election in 1935. A. becoming Prime Minister of Alberta on 3 Sept. of that year. He then tried to establish a currency system on social credit principles, his proposals involving the grant of a 'basic dividend' of £25 a month to every citizen, payable in non-negotiable certificates deposited with a special bank. These proposals also involved price control and taxation to recover expenditure on the dividends. The Alberta legislature passed the necessary legislation, including the Bank Taxation Bill, the Credit Regulation Bill, and a Press Control Bill, but all these measures were declared *ultra vires* by the Supreme Court of Canada, and their decision was upheld by the Judicial Committee of the Privy Council. Other unorthodox measures having failed A. reverted to orthodox finance, but in 1937 the Alberta budget showed a deficit of 1½ million dollars. By 1940 his majority had become considerably reduced. A.'s Social Credit Gov. was defeated for the first time in Feb. 1937 on a motion to adjourn the debate on the budget; after which A. introduced

a Social Credit Bill providing for a commission to administer the social credit plan. But in 1940, on his own advice, the legislature was dissolved, though the Social Credit Gov. was returned to power in the prov. election with A. at its head.

Abernethy, John (1680-1740), Irish Protestant divine. By his refusal to accept the synod's decision that he should go to Dublin (1717) he caused a div. in the Irish Presbyterian Church, the 2 parties becoming known as 'subscribers' and 'non-subscribers.' Ultimately he went to Dublin (1730), where he engaged in many theological controversies, and strongly opposed the Test Act.

Abernethy, John (1764-1831), surgeon, b. London, grandson of Irish Presbyterian minister (*supra*). Educ. at Wolverhampton Grammar School, he was appointed assistant surgeon at St Bartholomew's Hospital, 1787. Full surgeon from 1815 to 1827, during which period he gained a wide reputation for his daring and skilful conduct of operations for the cure of aneurysm. He pub. many surgical works and laid down two important principles which greatly influenced subsequent surgical practice: (1) that local diseases had a constitutional origin, and (2) that this origin could generally be traced to disorders of the digestive system. His reputation, however, rests mainly on his brilliance as a lecturer, and he was easily the most popular medical teacher of his day. His *Surgical and Physiological Works* were pub. in 1830. See G. Macilwain, *Memoirs of J. Abernethy*, 1856, and biography by J. L. Thornton, 1953.

Abernethy, burgh on the Tay, Perthshire, Scotland. It was the ant. cap. of the Picts, and possesses a round tower. Pop. 1150.

Aberration, a deviation: 1. In biology an abnormal structure, or departure from the type.

2. In optics, *A. of Light* is the apparent deviation of a star from its path, a phenomenon depending upon the relation between the velocity of light and the velocity of the earth in its orbit. A man walking with an umbrella provides what is perhaps the best illustration. If he wishes to shelter himself from vertically descending rain, he has to hold the umbrella before him at an angle which varies with his own pace and also with the downward speed of the rain. If his own rate is slow and the rain is descending swiftly the umbrella is held fairly upright; but a brisk walk through slowly falling rain necessitates inclining the umbrella well to the front. Now consider the case of an observer looking at a star through a telescope. The rays of light come from the star with a velocity of 186,283 m. a sec. whilst the observer himself with his telescope is travelling along the earth's orbit. In order to catch the rays proceeding from the star in the telescope tube, the instrument has to be tilted away from the direction of the light, just as the umbrella has to be inclined away from the true direction of the rain. The slope of the telescope therefore indicates

as the position of the star a point which is somewhat in advance of its true position. During a year the apparent position of a star describes a curve around its true position; this curve is an ellipse except when the star lies on the ecliptic, when it is a line along which the star appears to move backward and forward, and when it is in the pole of the ecliptic, the curve being then a circle. The semi-major axis of the ellipse is $20.47''$ and the semi-minor axis $20.47'' \sin(\text{star's latitude})$. As A. depends upon the ratio between the velocity of light and the velocity of the earth, the determination of this 'constant of A.' provides a method of calculating an approximate value of one of these velocities if the other be known.

Chromatic A. When ordinary white light passes through a convex lens, the violet rays are refracted most, and tend to come to a focus nearer to the lens than do the red rays. If a screen be placed near the focus of the violet rays the image will be found to have a red border, owing to the red rays not yet having converged. When the screen is moved a little further from the lens the border becomes violet, because the violet rays are now diverging again. A. of this kind, called chromatic, is often a nuisance in optical instruments. It may be remedied by coupling 2 carefully designed lenses made of different glasses, so that the differences in refracting powers bring the colours more nearly to the same focus. The arrangement is known as an achromatic doublet.

Spherical A. Even when the light passing through a spherical lens is monochromatic, the focusing is never quite exact. The image of a point is shown as a small circle, so that objects perceived are blurred in outline. Rays passing through the centre of the lens come to a focus farther away from the lens than those passing through the periphery. Spherical A. can therefore be avoided to some extent by the use of diaphragms limiting the used area of the lens. This A. is also corrected by a suitable combination of 2 lenses, or by using a lens with an aspherical surface.

Spherical A. is also occasioned by mirrors of spherical form. A parabolic mirror, however, gives an exact focus, which is the reason why such mirrors are used when a parallel beam of light is required, the source of light in this case being placed at the focus.

Abershaw, Louis Jeremiah, or 'Jerry' (1773?-85), Brit. highwayman mentioned by Borrow in his *Lavengro* as Jimmy Abershaw.

Aberillery, tn in Monmouthshire, England, noted for its collieries and tin-plate works. Pop. 27,800.

Aberystwyth, mkt tn of Cardiganshire, Wales, at the mouths of the R.s Ystwyth and Rheidol, in Cardigan Bay. A. is the seat of the University (Founder) College and National Library of Wales. There is evidence near by of stone and iron age occupation, and the remains of Edward I's castle and Owen Glendower's dwelling still exist. It is the administrative centre for a wide area, and has become

the seat of government for W. central Wales and a cultural centre for the Principality. A.'s industries include agriculture, the servicing and distribution of agric. equipment, boat building, and sea and river fishing. Pop. 10,200.

Abeshir, cap. of central Sudan, on the caravan route from Khartoum to Kuka. Pop. about 25,000.

Abettor, term used both in a legal and general sense, indicates a person who instigates or encourages an offence, without taking any active part in it. See also ACCESSORY and ACCOMPLICE.

Abeyance, legal term derived from the O.F. *beer*, to gape after. The term is used to imply the state of suspense of the rights in a freehold or a title of honour. It is a maxim of Eng. law that freehold cannot be put in A. by any action of the owner, the underlying idea being that some person should be in existence for the discharge of feudal duties. Where, however, a life interest only exists in lands, such for example as in the case of a bishop, that interest is said to be in A. until the appointment of his successor. In the same way, where a title can be held only by male heirs that title may be in A. if the persons next in inheritance to the last possessor are females. The title is not extinct, for the birth of a son to any of the female heirs can revive it.

Abgar, name of a line of rulers of Edessa in Mesopotamia during 1st cent. BC-3rd cent. AD. They were 29 in number, the best known being Abgar V. He it was who is said to have written to Jesus asking Him to come and cure him of a disease. Eusebius (*Ecll. Hist.* i. 13) trans. this letter, and the reply of Christ promising to send a disciple after His ascension, from the Syriac to Gk, but their authenticity was discredited by Pope Gelasius in 494.

Abhorrens, court party in the reign of Charles II who 'abhorred' the views of the rival party, led by Shaftesbury, who opposed the royal prerogative. The former evolved into the Tories and the latter into the Whigs. See TORRY.

Abiathar, son of Ahimelech (q.v.) and high priest under David and Solomon. He alone escaped from the massacre carried out by Saul. He joined David at the cave of Adullam, and remained faithful to him during the latter's life. He was deposed by King Solomon for his participation in the rebellion of Adonijah and banished.

Abib, or **Nisan**, formerly the first month in the Jewish calendar, but according to present-day reckoning the seventh. It corresponds to part of Mar. and part of April. In it is celebrated the feast of the Passover.

Abies, See FIR.

Abies, in fossil botany, the name given by Brongniart to the *A. laricinae*, a single incomplete specimen of a fruit resembling the spruce fir (*A. excelsa*). Its locality is unknown.

Abietineae, tribe of the family Pinaceae, belonging to the class Coniferae, consisting of the genera *Abies*, *Keleleria*, *Picea*, *Pinus*, *Larix*, and *Pseudolarix* (q.v.).

Abigail, wife of Nabal, the rich man who refused hospitality to King David when fleeing his kingdom. A. intercepted David when later he returned, and so won his heart that not only did he forgo his chastisement of Nabal, but after the latter's death took A. to wife. Another A. was the sister of David. The name is sometimes applied to a female servant because A. so described herself.

Abijah, name of more than one biblical character, of whom the chief was the son of King Rehoboam. He was engaged in war with and defeated Jeroboam, the other king of the divided kingdom of Palestine.

Abila, see **ABYLA**.

Abilene, co. seat of Taylor co., Texas, U.S.A., 150 m. W. of Fort Worth; has flour and planing mills, and deals in cotton. Pop. 45,600.

Abimelech: 1. Name of two Philistine kings, father and son, who, thinking the wives of Abraham and Isaac to be their sisters, married them. Both were restored to their husbands when their true relationship was revealed. (Gen. xx and xxv.)

2. Natural son of Gideon, who (Judges ix) murdered his 70 brothers (except the youngest, Jotham, who escaped) and became King of Shechem. Jotham protested in the parable of the bramble-king, the first biblical parable.

Abingdon, historic tn. of Berks, England, on the Thames, 6 m. S. of Oxford, formerly the co. tn and now a flourishing residential and mkt tn, with some light industries, including motor-cars, leather, pre-stressed concrete, and scientific instruments. Interesting buildings include the remains of the Benedictine abbey (founded in the 7th cent.); the Guildhall (c. 1440); the former Co. Hall (1677); a fine par. church (c. 1450); and the Elizabethan schoolroom of what is now a boys' public school. There are facilities for boating and fishing. Pop. 12,000.

Abinger, Sir James Scarlett, 1st Baron (1789-1844), Eng. politician and judge, b. Jamaica, educ. at Cambridge, studied at the Inner Temple, and was called to the Bar in 1791. In 1819 he entered parliament as Whig member for Peterborough; was knighted and appointed attorney-general in Canning's ministry (1827), and in Wellington's (1829-30). A. successfully carried through a Bill to amend the administration of justice (1830), but opposed the Reform Bill of 1831. He was raised to the bench by Peel (1834) as lord chief baron of the Court of Exchequer and created Baron A. in 1835.

Abinger, vil. near Dorking, Surrey. It has an observatory to which, in 1925, was transferred from the Royal Observatory, Greenwich, the work of recording earth magnetism.

Abington, Mrs Fanny (1737-1815), celebrated actress, b. London. Debut at Haymarket, 1755, as Miranda in *The Tempest*. Created 30 original characters, including Lady Teazle (1777), and impersonated many of Shakespeare's heroines.

Abiogenesis, the supposed production

of living from non-living matter. The more popular term is spontaneous generation, and under this name the possibility of the phenomenon was generally believed in until recent times. The ancients supposed that bees and flies were generated in putrefying carcasses, and that mud and filth brought forth such creatures as eels, frogs, and mice. The growing knowledge of the life history of those animals gradually dispelled the belief, but at a later period it was held that the bacteria of fermentation and putrefaction owed their origin wholly to the substances in which they were found. Pasteur was to a great extent responsible for the conclusion that if a substance has been sterilised only infection from outside sources can reintroduce bacteria. Complete sterilisation, however, is difficult to obtain, for some bacteria survive the temperature of boiling; and the presence of germs, too, is so widespread and their multiplication so rapid that workers before the time of Pasteur had found it difficult to establish a direct refutation of the theory. The mere fact that the earth must have been at one time a molten mass of inorganic matter is sufficient to encourage many in the belief that it may yet be possible to produce life from non-living matter. On Pasteur's work are based all the modern methods of food preservation by canning, bottling, etc., including the pasteurisation of milk, named after him. See **ANTI-SEPTICS**.

Abipones, formerly a fine race of S. Amer. Indians inhabiting Paraguay, who by their courage proved very formidable opponents to the Spaniards. Now incorporated with other tribes. See M. Dobrizhoffer, *An Account of the Abipones* (3 vols., trans.), 1822.

Abishai, King David's nephew, a great warrior who accompanied David on the night expedition to the camp of Saul (1 Sam. xxvi. 6-9). With 2 others he broke through the Philistine ranks, and once he slew 300 men. He was faithful to David during Absalom's revolt.

Abjuration, Oath of, oath taken by holders of public office, such as members of parliament, clerics, and lawyers, originally imposed in the reign of William III, and requiring the taker of the oath (juror) to abjure the claims of the Stuart pretender or his heirs to the throne. It also rejected the opinion that the Pope had any jurisdiction in England, or that princes excommunicated by him could be deposed or murdered. After many modifications with a view to relieving Jews, Catholics, etc., the various statutes were consolidated in the Promissory Oaths Act, 1868. The famous Bradlaugh (q.v.) case arose from Bradlaugh's objection to the final wording of the oath, 'so help me God.'

Abjuration of the Realm. By the old common law of England, if a person accused of any crime other than treason or sacrilege took sanctuary in a par. church or churchyard, and within 40 days went in sackcloth to the coroner and confessed his guilt, he was allowed to take the

oath of A. of the R., i.e. he would leave the country forthwith and never return without licence from the king. All his property was forfeited, and the penalty for returning without leave was hanging. By a statute of Elizabeth (35 Eliz. c. 2) Rom. Catholics and Dissenters might be required to abjure the realm. The privilege of sanctuary was abolished in the reign of James I.

Abkhazia, autonomous rep. in NW. Georgia, situated between the main Caucasian range and the Black Sea, with a subtropical climate on the shore. It has coal deposits. Area 3300 sq. m.; pop. over 300,000, mainly Georgians and Abkhazians (a Caucasian-speaking people related to the Circassians, and numbering 58,000 in 1939). Tobacco, citrus and other fruits, and tea are cultivated; viticulture, cattle-raising, and bee-keeping are practised, and there are tobacco, food, saw-milling, and coal-mining industries. There are many health resorts. The cap. is Sukhumi. A. belonged to Colchis (q.v.), later to Pontus, Rome, and Byzantium, became independent in 756, and was merged in the all-Georgian state in 985. It became a separate principality in the 16th cent., fell under Turkish rule in 1578, under Russian in 1810, and was abolished in 1864. There were uprisings against Russian rule, and many Abkhazians emigrated to Turkey. The autonomous rep. was formed in 1921. In 1938-53 Abkhazians were subject to a policy of assimilation by the Georgian authorities. See W. Kolarz, *Russia and her Colonies*, 1952.

Abblancourt, Nicolas Perrot d' (1606-1664), Fr. translator of Gk and Rom. writers. He trans. the whole of Tacitus and 4 of Cicero's orations, but his versions, being somewhat paraphrastic, have long been superseded.

Ablaut, Ger. term used by philologists to signify a relation existing between the vowels of certain series of related words in Indo-European languages, caused by the Indo-European system of accentuation. It is most clearly shown in the strong verbs, where it is still to be found in modern Eng. The relation of *e, a, u* in the verb *drink, drank, drunk* is an A. relation, the vowels themselves forming an A. series.

Able-bodied Seaman (A.B.). In the R.N. a youth about 18 signs on for 12 years, and after attaining proficiency in gunnery, or any other specified branch or trade, becomes an A.B. In the merchant service the term is used for any man who has had 2 years' experience before the mast.

Abner, cousin of Saul and captain of his army. After Saul's death A. proclaimed Ishbosheth king. To reconcile the rival claims of Ishbosheth and David he visited the latter at Hebron, where, to David's great sorrow, he was treacherously slain by Joab, whose youngest brother Asahel A. had killed in battle (2 Sam. ii and iii).

Abney, Sir Thomas (1640-1722), one of the original promoters and directors of the Bank of England. Benefactor of St Thomas's Hospital; lord mayor of London, 1700-1.

Abney, Sir William de Wivelsale (1844-1921), physicist and astronomer, b. Derby. He was educ. at the Royal Military Academy, Woolwich. He pub. important works on stellar photography and wrote valuable treatises on spectroscopy; he was President of the Royal Astronomical Society, 1893-5. Pubs. include *Treatise on Photography*, 1875, *Colour Vision, Colour Measurement and Mixture*, 1893, *Researches in Colour Vision*, 1913, and *Trichromatic Theory of Colour*, 1914.

Abney Park, dist. in N. London, in the bor. of Stoke Newington; has a large cemetery, dedicated in May 1840 and notable for its old trees and arboretum. The dist. is named after Sir Thomas Abney (q.v.), who lived here.

Abo, see TURAKU.

Abo, in S. Nigeria at head of Niger delta. Palm oil largely exported. In 1930 A. (and also Opobo) was the scene of rioting, in which native women took a leading part, the cause of the unrest being the uneconomic prices obtained for palm kernels. In the restoration of order, more than a score of women were killed by the rifle fire of native police. Pop. 8000.

Abode, see DOMICILE.

Abolitionists, name of party in the U.S.A. who demanded the abolition of slavery. Although many individuals had held opinions hostile to slavery, especially among the Quakers, it was not until 1774 that Benjamin Franklin presided over their first congress in Philadelphia. Towards the end of the third decade of the 19th cent. the movement against slavery began to make great headway, and in 1831 one of its chief leaders, Wm Lloyd Garrison (q.v.), began to publish its organ, the *Liberator*, in Boston. The New England Anti-Slavery Society, formed in 1832, became the nucleus of a great political party which influenced and finally (1856) merged with the Republican party. The feeling against the A. was naturally very strong in the S. or slave-owning states, the legislature of Georgia even going the length of offering a reward of \$5000 to anyone who could secure the conviction of Garrison. Even in his own city of Boston Garrison was severely handled by the mob. No doubt much of the unpopularity incurred by the A. was due to the practical assistance rendered to runaway slaves by an organisation called the 'Underground Railway.' The Abolitionist ideals finally triumphed when President Lincoln proclaimed the freedom of the slaves on 1 Jan. 1863.

Abomey, walled city, formerly the cap. of Dahomey, the Negro kingdom of W. Africa, about 70 m. from Porto Novo. It was occupied by the French when they conquered Dahomey in 1892. A. is connected by road with Ketou, 75 m. Pop. 11,300.

Aborigines, formerly the name given by Gk and Rom. writers who treated of the earliest period of Rom. hist. to a tribe who occupied, with their allies, the Pelasgi, the dist. of Latium. Now used to denote the original inhab. of any

country, and more particularly the natives found in a country conquered or colonised by Europeans. The Aborigines' Protection Society, founded in 1833, has formulated regulations designed to secure the natives of Brit. and other colonies from ill usage by white officials or colonists. In 1872 and 1875 Acts were passed for the protection of the Pacific islanders, especially in relation to their importation as labourers into Australia. The dominion of Canada has exclusive control over its aboriginal tribes, but for other

repetition. It is probably due to some endocrine disturbance, but this theory is not supported by the poor results of treatment with hormones.

The symptoms comprise pains in the loins and a sense of bearing down, accompanied by a discharge of blood. The discharge, if continued, results in the expulsion of the foetus, and it is advisable that the matter discharged should be kept for examination by a medical man, as the treatment depends upon the possibility of preventing the miscarriage altogether. The patient should be kept quiet in a recumbent position. If it be impossible to prevent the occurrence, the treatment then aims at bringing about the expulsion as quickly as possible, and with a minimum amount of derangement. The mechanism of A. is the same as in a full-time birth, but in miniature. The main complications of A. are haemorrhage and septic infection. Infection following A. is far more common than in normal labour owing to the fact that many A.s are self- or criminally induced, without regard for asepsis and without medical attention. Sepsis is the commonest cause of death after A.

The procuring of A. by a pregnant woman, by taking drugs or using instruments, is a felony, and any person who endeavours to procure the miscarriage of any woman by administering drugs, or using any instrument or other means with the same object, is guilty of a felony. The penalty is penal servitude for life or not less than 3 years, or imprisonment not exceeding 2 years with or without hard labour. To supply or procure drugs or instruments, knowing that they are to be used with the object of procuring a miscarriage, is a misdemeanour. The penalty in this case is penal servitude not exceeding 5 or less than 3 years, or imprisonment not exceeding 2 years with or without hard labour. Persons tried under the Offences Against the Persons Act, 1861, for administering drugs or using instruments to procure A. may be convicted of the felony of child destruction under the Infant Life (Preservation) Act, 1919. An A. brought about artificially to save the mother's life or health is not a crime; but the burden of proof is on the person bringing about the A. A doctor will not carry out a therapeutic A. without first consulting one or more colleagues who are specialists in the particular disease for which A. is contemplated.

Abou-hannes (*Ibis religiosa*, Cuvier; *Tantalus aethiopicus*, Latham), an Egyptian word meaning Father John, is a bird which in ant times was regarded with great veneration by the Egyptians. It is no doubt the white or sacred ibis mentioned by Herodotus (ii. 76).

Abou-harb, Arabic name of the Leucoryx antelope.

Aboukir, vil. on Aboukir Bay, 13 m. NE. of Alexandria, Egypt. The battle of the Nile was fought in Aboukir Bay, 1798, when the Fr. were completely defeated by Nelson. In 1799 Napoleon defeated the Turks with an army of



E.N.I.

AUSTRALIAN ABORIGINE

colonies special protection is afforded the natives by the imperial gov. In 1890, by the General Act of the Brussels Conference, the adhering powers agreed to certain restrictive measures concerning the sale of drink to natives, etc.

Abortion (Lat. *aboriri*, to miscarry), premature expulsion of the foetus from the womb before the seventh month. Later such an occurrence is called premature birth. Cases of A. due to accidental or pathological causes are frequently known simply as miscarriages.

The expulsion of the foetus is by no means rare, and may be the result of a salutary effort of nature to get rid of diseased matter within the womb; or it may be deliberately induced; or it may be due to preventable causes. The malformed or diseased condition of the womb may lead to the death of the foetus. Some women habitually abort within the first few months of each pregnancy, and no obvious reason can be found for this

18,000 men there, and in 1801 Sir Ralph Abercrombie defeated the French.

Abousambul, see **ABUSMABEL**.

About, **Edmond François Valentin** (1825-85), Fr. author, b. Dieuze, Lorraine. He was educ. at the École Normale, Paris, and at Athens. In 1854 he wrote *La Grèce contemporaine*, which was a great success, and *Tolla*, a novel, 1855. Other novels are *Le Roi des montagnes*, 1856; *Le Nez d'un notaire*, 1862; *L'Homme à l'oreille cassée*, 1862; *Le Cas de M. Guérin*, 1862, 3 fantastic tales; *Trente et quarante*, 1865; and *Le Roman d'un brave homme*, 1880. He contributed to the journals and founded *Le XIX^e Siècle* in 1871, and wrote *Le Progrès*, a study of social reforms, 1864. As a dramatist, however, he was not successful, although he wrote *Gaétana*, 1862, and *Guilleri*, 1856, a comedy. He was elected a member of the Fr. Academy, 1884. See life by M. Thiébaud, 1936.

Abrahanel, see **ABARBANEL**.

Abacadabra, magical word, written in the form of a triangle, and used by anct as a spell to overthrow evil spirits, and to cure fever and other maladies.

A B R A C A D A B R A
A B R A C A D A B R
A B R A C A D A B
A B R A C A D A
A B R A C A D
A B R A C A
A B R A C
A B R A
A B R
A B
A

According to Sammonicus Serenus, a doctor and poet, at the commencement of the 3rd cent., the letters of the word must be written in the form of a triangle so that it can be read in different ways. It was often written on a piece of paper, folded, and worn round the neck.

Abraham, great patriarch of the Heb. race. He was b. in Ur of the Chaldees, the son of Terah, an idolater (Joshua xxiv. 2); he set out with his father, his wife, Sarai, who was also his half-sister (Gen. xx. 12), and Lot, his nephew, and settled for a time in Haran, where Terah d. (Gen. xi. 31). Thence, at the call of God, he went into Canaan, taking his wife and nephew, with his household and property (Gen. xii. 1). At Shechem A. first received the promise of the land, and he built an altar to the Lord; a second he built at Bethel, as he journeyed S. (Gen. xii. 7-9). Famine in Canaan drove A. to Egypt, where, calling Sarai his sister, he brought her into grave danger. God protected her, and A. returned to Canaan (Gen. xii. 10; xiii. 1). A. and Lot separated at Bethel, and A. moved to Hebron (Gen. xiii). He defeated Chedorlaomer, and both booty and captives were rescued, including Lot. Melchizedek, King of Salem, met A. and blessed him. A., now an old man and childless, doubted the promise to his seed, but God renewed it (Gen. xv). His first son, Ishmael, was b. of Hagar, the Egyptian maid (Gen. xvi. 1). In his hundredth year, God

changed the name of Abram, 'exalted father,' to Abraham, 'father of many' (Gen. xvii. 5), and in her ninetieth year Sarai's name was changed to Sarah, and she was promised a son, whereat A., incredulous, laughed; hence the son's name, Isaac, from the Heb. verb 'to laugh.' Told by the Lord of the impending destruction of Sodom, A. interceded (Gen. xviii). At the birth of Isaac (Gen. xxi. 1), Ishmael and his mother were driven away (Gen. xxi. 8). At Beersheba an alliance was arranged between A. and Abimelech, the Philistine king (Gen. xxi. 22). While in the Philistine country, A.'s faith was tested when he was told to sacrifice his son Isaac (Gen. xxii), a command withdrawn at the last minute. Sarah d., and A. bought the cave of Machpelah as a burying-place; and, feeling his end near, sent for Rebekah as a wife for Isaac (Gen. xxiv). A.'s second wife was Keturah, by whom he had 6 sons (Gen. xxv. 1). At the age of 175 he d., and was buried by Isaac and Ishmael in the cave of Machpelah (Gen. xxv). A. is known as 'The Friend of God,' and not only as the spiritual ancestor of many (Christian as well as Hebrew), but as the 'prophet' (Gen. xx. 7) through whom the revelation was begun. A. (Arabic Ibrahim) is also an important figure in Islam. Some Mohammedans say that the intended victim of his sacrifice was Isaac; but the accepted view is that it was Ismail (Ishmael), and that the place was near Mecca, the site of some of the ceremonies of the pilgrimage. A. and his son rebuilt the Kaaba, and the horns of the ram of sacrifice were fixed to it. See C. L. Woolley, *Abraham*, 1936.

Abraham, Plains of, or Heights of, in Quebec city, Quebec, Canada. Here was fought the battle of the Heights of Abraham, 1759, between the Fr. under Montcalm and the Eng. under Wolfe. The Fr. were defeated and Canada became a Brit. possession.

Abraham a Sancta Clara (1644-1709), whose real name was Ulrich Megerle, b. near Möskirch, Swabia, Germany, and d. Vienna. He was a very popular Ger. preacher, joined the Augustinians, became court preacher at Vienna, went to Graz, but afterwards returned to Vienna. His sermons are full of imagination, but nevertheless contain sound doctrine. Schiller's *Wallensteins Lager* was inspired by his sermon, 'Up, up, ye Christians!'

Abraham-man, wandering beggar of Elizabethan times, who was either demented or shammed lunacy in order to excite pity. The term is derived from the parable in Luke xvi, where Lazarus the beggar is received into Abraham's bosom. Another name for these vagabonds was Tom o' Bedlam; in Shakespeare's *King Lear* the disinherited Edgar takes the guise of one of these.

Abrahamites: 1. Sect of Syrian heretics, said to be allied to the Paulicians, who denied the divinity of Christ. Their founder was Ibrahim, or Abraham, of Antioch.

2. Sect of Bohemian deists, who claimed the original religion of Abraham.

They denied the Trinity, and accepted from the Bible only the Ten Commandments and the Lord's Prayer, declaring themselves followers of John Huss (q.v.). Joseph II transported them to Transylvania in 1783.

Abraham's Bosom, metaphorical name for the abode of righteous souls after death, used by Christ in the parable of the Rich Man and Lazarus. The ancients reclined on couches at table for meals, so that necessarily the head of each guest lay towards the breast of his neighbour. The expression denotes honour, refreshment, and absolute repose.

Abrantes (anct *Aurantes*), tn of Portugal, in Santarém dist., on the Tagus (q.v.), 32 m. N.E. of Santarém. In 1807 it was captured by Junot (q.v.), who was created Duc d'A. There is a trade in cereals, fruit, and olive oil. Pop. 4200.

Abrasives (from Lat. *ab*, away; *radere*, to scratch), mineral substances used for polishing and grinding, e.g. emery, sand, pumice, grindstone, millstones, corundum, rouge, and garnet.

Abraxas, name devised by the heretic Basilides, containing those Gk letters which, according to the numeral system then in use, stood for 365, and expressing the all-pervading spirits of the universe. The word was engraved on gems among the ancients and the term is also used for a stone or gem thus engraved.

Abrazite, see PHILLIPSITE.

Abrogation: 1. In canon law the annulling of any previous law either by decree or disuse.

2. In Eng. law the reversion or repeal by a higher legislative authority of the order of a subordinate court.

Abrus, genus of shrubs of sub-order Papilionateae of order Leguminosae, growing in E. Indies. *A. precatorius*, wild liquorice, Crab's Eye Vine. Weather Plant, is a W. Indian plant, the seeds of which are scarlet tipped with black. They are used as weights, and are strung together into necklaces and rosaries, whence they obtain the name of 'prayer-beads.'

Abruzzi, Luigi Amadeo Giuseppe Maria Ferdinando Francesco di Savoia-Aosta, Duca di (1873-1933), son of Amadeo, Duke of Aosta, b. Madrid. He ascended Mt St Elias, in Alaska, in 1897; beat Nansen's record in his polar expedition of 1900; ascended highest peaks of the Ruwenzori Mts in central Africa in 1906; Mt Kenya in Brit. E. Africa in 1909; and climbed to 24,600 ft in the Karakoram. He commanded an It. squadron during the Tripolitan war of 1912. In 1913 he was made commander of the It. Navy, and assumed active command in 1915 when Italy intervened in the First World War. He retired in 1917 through disagreement with his staff. His writings include *The Ascent of Mount St Elias*, 1900; *Farther North than Nansen*, 1901; *On the 'Polar Star' in the Arctic Sea*, 1903; *Ruvenzori*, 1908.

Abruzzi e Molise, region (*compartimento*) of central Italy, comprising the provs. of L'Aquila, Chieti, Pescara, Teramo, and Campobasso (qq.v.). It is

bounded N. by the Marches, W. by Lazio, S. by Campania, S.E. by Apulia, and E. by the Adriatic (qq.v.). The region contains some of the highest peaks of the central Apennines (q.v.). The riv. valleys are fertile, cereals, rice, vines, olives, and almonds are grown, sheep are raised in the hills, and there are large herds of swine in the woods. The chief tn is L'Aquila. Area 5930 sq. m.; pop. 1,699,000.

Absalom, third son of David and Maacah, daughter of the King of Geshur, killed his brother Amnon for assaulting his sister, Tamar, but was, after a long exile, pardoned by his father. Able, ambitious, and handsome, he prepared the way for a revolt by cunningly cultivating the goodwill of the people. After 4 years he raised his standard at Hebron, and had such success that David fled to Mahanaim beyond Jordan. A. was aided by Ahithophel; but Hushai, David's friend, joined A. to defeat the plan of Ahithophel; who, seeing his counsel ignored, hanged himself. A. was routed in the Forest of Ephraim, caught by the hair in the branches of a terebinth, and was slain by Joab, in spite of the king's order to 'deal gently' with him. David's lament for his son is famous. See 2 Sam. iii and xiii-xviii.

Absalon, or **Axel** (c. 1128-1201), Dan. statesman, b. in the is. of Seeland, Denmark, became Archbishop of Lund (1178), and minister to Valdemar I and Canute VI of Denmark. He took an active part in helping with the legislation of Valdemar, and drove the Wendish pirates from the country. Under Canute he helped to overthrow Bogislaw of Pomerania. Besides being a great statesman and general, he was a lover of art and learning, assisting Saxo Grammaticus with his great hist. of Denmark. He built a castle which was the nucleus of the city of Copenhagen.

Abscess, a collection of pus as the result of bacterial inflammation. When pathogenic organisms gain access to any part of the human body, the white blood corpuscles engage in a struggle with the invaders. If the hostile germs are not quickly destroyed the contest proceeds until there is formed a creamy mass of dead corpuscles and bacteria known as pus. This may be absorbed into the bloodstream by other corpuscles, but is more frequently discharged by the disintegration of the covering tissue.

Abscissa, see CO-ORDINATES.

Absecone (from Lat. *abscondere*, to hide), small lantern, of anct origin, used in the Catholic Church during the performance of the night offices.

Absentee, term applied to one who receives from an estate rent which he spends in another country, or to one who draws a salary from an office without performing its duties, or to workmen who stay away from work for reasons other than illness (i.e. because they prefer leisure to more income). The effect of absenteeism is twofold, moral and economic. The introduction of middlemen, or agents, tends to lessen the sense that property owners have obligations as

well as privileges. Also the property owner by absence loses that personal touch between owner and tenant which tends to promote community of interest. The economic result of absenteeism has been the subject of much debate among economists, but there is no general opinion among them, as there is in the popular mind, that the A. by spending his money abroad is depriving the industries of his own country of support. On the other hand, it is argued that the A. still indirectly supports the industries of the homeland, for there must be an export of goods from his native country equivalent to the amount of goods he consumes, otherwise his remittances could not be made to him. Much of Irish poverty has been attributed to absenteeism, and Acts were passed in the reigns of Richard II and Henry VIII to check it.

Absinthe, aperitif banned in France on the outbreak of the First World War and since then in most other countries. Of very high alcoholic degree, it owed its taste to aniseed, and its popularity to its reputation for wickedness, studiously maintained by the Fr. decadents at the turn of the cent., and its attractive way of curdling when water was dripped into it through sugar and a perforated silver spoon. Its deleterious effects were ascribed to the presence of wormwood (*Artemisia absinthium*) among the herbs compounding it; but there is no wormwood in the various substitutes now sold in France, though as 'vermouth' means 'wormwood' it is presumably present in the aperitifs sold under this name. Taken in moderation A. was quite innocuous, but it was deadly when taken almost undiluted early in the morning instead of the *petit déjeuner*, as it often was in the manufacturing dists. of Paris. See M. I. Fisher, *Liqueurs*, 1951, and H. Warner Allen, *Through the Wine-glass*, 1954.

Absolute. Its adjectival signification is opposed to relative, contingent, or conditioned; the result of the highest abstraction. Thus it has come about that in its substantial sense it has been regarded by some as the fundamental principle and cause of all being (Gk to *on*), while others (notably Hamilton and Renouvier) regard it as a fantastic conception—a pseudo-idea. These differences of opinion arise from the fact that our minds can only regard anything relatively which is opposed to the principle of the A. That the A. is the all-pervading, unconditioned, and necessary principle of all things is the basis of the philosophy of Descartes, Spinoza, Schelling, and Hegel, while Kant holds that the mind cannot form an idea of the A. Perhaps it is best to regard it as what is constant, invariable, and necessary in the relation between one idea and another—as that which could not be other than what it is whether regarded subjectively or objectively.

In physics A. velocity was once considered to be the rate of motion through space as opposed to relative velocity, which is the rate with which 2 objects

approach or recede from each other. The Michelson-Morley experiment (q.v.) showed, however, that absolute motion does not exist. A. weight is the weight of a body viewed apart from all modifying influences, as, for instance, of the atmosphere; and, to ascertain its amount, the body must, therefore, be weighed *in vacuo* or allowance must be made for buoyancy (q.v.). A. numbers are those which stand in an equation without having any letters combined with them; thus in the following equation

$$5x \times 11 = 31$$

11 and 31 are A. numbers, but 5 is not so. See also RELATIVITY.

Absolute Alcohol, see ALCOHOL.

Absolute Magnitude, in astronomy, term applied in contradistinction to the 'apparent' magnitude of stars viewed from the earth. In other words it implies the luminosity of the star irrespective of its distance, and, mathematically, it is the number expressing, in accordance with the usual system of stellar magnitude, the brightness of the star as it would be if it were at the distance of 10 parsecs—parallax 0.1". If the distance of any given star be known, its A. M. can be calculated from its apparent magnitude; or, again, if the A. M. and apparent magnitude be known, the actual distance of the star can be determined; the numerical relation between the absolute (M) and the apparent (P) being $M = P + 5 + 5 \log \pi$, where π is the decimal fraction of a second of arc that indicates the parallax. The nearer stars are not necessarily the brighter, nor are the apparently bright stars necessarily very bright intrinsically. A star of A. M. 4.85 emits as much light as the sun; one of A. M. 0, 87 times as much, and one of -5, over 8000 times as much. For the various magnitudes of Ptolemy and the cataloguing of stars according to magnitude, see MAGNITUDE.

Absolute Monarchy, see ABSOLUTISM.

Absolute Temperature is given by an absolute scale of temp. which is chosen to be independent of the properties of the thermometric substance. *Absolute thermo-dynamic temp.*, proposed by Kelvin, is defined according to the principles of thermodynamics alone and closely approximates to the temp. on the Gas Scale. It is usually expressed in units of degrees Celsius (or Centigrade) from absolute zero, and the ice-point is then about 273° K. *Absolute zero* is the zero of the absolute scale of temp. and has been approached in experiments to within one thousandth of a degree. See HEAT; TEMPERATURE; THERMODYNAMICS.

Absolute Zero, see GAS AND GASES; METROLOGY; TEMPERATURE.

Absolution, religious ceremony by which the Christian priest declares an individual, on repentance and submission to the requisite penance, to be absolved either from his sin or from the eccles. punishment to which it rendered him liable. Since the 12th cent. the formula used in the Rom. Catholic Church has been: 'Ego te absolvo a peccatis tuis' (I absolve thee

from thy sins), accompanied by the sign of the cross. The Council of Trent expressly condemned (Session xiv, Canon 4) the doctrine that the priest has not power of himself to absolve from the guilt of sin. The Church of England also holds (cf. the introduction to Morning and Evening Prayer, and the form for the ordaining of priests) that power has been left with the Church to absolve repentant sinners, and the words prescribed in the Office for the Visitation of the Sick are, as in the Roman rite, 'I absolve thee from thy sins.' In the Protestant Church of Scotland, the term A. is commonly used to denote simply the declaration of the Kirk session, or other indicatory, expressed by the mouth of its president, that the party is released from the eccles. interdict to which his delinquency had subjected him; this approaches the original use of the word with the early Christians. The word is used also in a minor sense to describe a prayer for God's forgiveness uttered by a priest, or even by a layman, after a general confession of sinfulness by others, e.g. in the Latin Preparation for Mass, and Compline, or in the Anglican Communion Office; and it is even applied in the Book of Common Prayer to the general reminder given, after the General Confession at Morning and Evening Prayer that priestly A. is obtainable if people are truly penitent, which they are exhorted to pray to be in the words of the Lord's Prayer.

Absolutism, form of gov. as opposed to constitutionalism, in which the king or ruler is the supreme head, responsible to no parliament or constitutional check. A. did not exist in modern times until its reappearance with the dictatorial or 'leader' states of Russia, Germany, and Italy. In the Middle Ages A. was a necessity to centralise the strength of a nation for self-defence, and to remove the power of the feudal lords by changing them from autocrats into courtiers. Continental A. of the 18th cent. had not the anti-democratic character of Communism and Fascism; it buttressed the central power at the expense of the nobility. Indeed, it styled itself 'benevolent' or 'enlightened'. A. See GOVERNMENT and INDIVIDUALISM.

Absolutists, Sp. political party opposed to the constitution of 1812. They wished to restore to the Crown its former absolute powers. Subsequently the A. supported the pretensions of Don Carlos against Queen Isabel.

Absorption, the process by which one substance is taken up by another. When a liquid is absorbed by such a substance as blotting-paper, the action depends on capillarity (q.v.). Plants are enabled by their root fibres to absorb liquid matter into their tissues by osmosis (q.v.). In the process of digestion, the intestines absorb compounds necessary for the nutrition of the body. The term A. has also some special applications in physics.

Absorption of gases by liquids. Gases may be absorbed or dissolved by liquids.

The solubility of different gases in water varies considerably. One vol. of water at 0° C. and atmospheric pressure absorbs only .02 vol. of nitrogen, whilst ammonia at the same temp. and pressure dissolves to the extent of 1050 vols. to 1 vol. of water. The mass absorbed increases in proportion to the pressure (Henry's Law), but decreases as the temp. increases, though not in exact proportion.

Absorption of gases by solids. Some solids also have the property of absorbing gases, the best-known example being charcoal, which can absorb large quantities of ammonia, chlorine, phosgene, and other gases. To this power of absorbing gases charcoal owes its efficacy as a deodorant. After being heated in superheated steam charcoal becomes even more efficient an absorbent, and is said to be 'activated.' Active charcoal is used in gas masks. Platinum black, if surrounded by a mixture of hydrogen and oxygen, absorbs so much of the gases, and therefore brings them into such intimate molecular contact, that sufficient heat is given out to ignite the rest of the gas. Scientifically A. is distinguished from adsorption, the two together being known as sorption. Adsorption implies the taking up of a gas by the surface layers of a solid, while A. implies the taking up of the gas by the interior of the solid. Hence adsorption always precedes A.

A. of light and heat. Electromagnetic waves, e.g. light and heat, are liable to be interrupted by intervening substances. Some rays may be transmitted with more or less disturbance of direction, some may be reflected, and some may be absorbed; that is, energy is given to the particles of the intervening substance, and its temp. rises. A particular substance may absorb rays of certain frequencies, allowing the others to be transmitted or reflected. The long waves produced by electrical methods can pass through thick, opaque obstacles without being absorbed. The shorter heat-waves are absorbed readily by dark substances such as lamp black, whilst the various wave-lengths which correspond to the different colour sensations are variously affected by different substances, the result determining the colour as seen by transmitted light. In green glass, for example, only green rays are allowed to pass through, the other components of the white light which enters the substance being absorbed and converted into heat. What light is reflected is white, so that if green glass be ground up it reduces to a white powder; similarly, the foam of a transparent green liquid is white. Even reflected light penetrates the surface to some extent, and the amount of penetration has an effect on the character of the A., and consequently on the colour of the reflected light. Gold, for instance, reflects white light at the surface, and also light which by A. before it returns to the surface is orange. In the interior of a gold vessel we get repeated reflection, which means repeated A., and the resultant colour is a deep orange.

A. bands are dark lines in the spectrum of light transmitted through substances. They indicate the absence of the particular wave-lengths which have been absorbed, and vary with the temp. and thickness of the substance. See ADSORPTION and FRAUNHOFER LINES.

Abstinence, see BAND OF HOPE MOVEMENT and TEMPERANCE.

Abstract, in law, the brief statement of the prin. fact in a document—used now generally with relation to the purchase of land—the A. being furnished by the vendor to the purchaser; in time, it now extends back 30 years, and traces the devolution of title, legal and equitable, of the land in question. If not satisfactory, the purchaser must object within a certain period. See also VENDORS and PURCHASERS.

An A. thought or term has regard only for qualities or essences without reference to individual or particular things, e.g. wisdom.

Abstract Art, painting or sculpture which does not represent the appearance of objects in nature but concentrates on harmonious or effective combinations of colour and form 'in themselves.' In eliminating imitation and description it may be said to 'aspire to the condition of music' (and, in a popular form, Walt Disney's *Fantasia* illustrates this point with the accompaniment of abstract shapes and colours by a musical composition). A. A. is, however, to be distinguished from decoration or pattern, and a subconscious element is allowed, or considered, to play a part in the final result. All great art has this abstract element, even when it is otherwise realistic or 'true to nature,' but uncompromising abstraction is modern; perhaps to be dated from Cézanne's dictum that 'everything is geometry,' certainly from the advent of cubism between c. 1907 and 1914. Picasso, Braque, Juan Gris, Léger, Marcel Duchamp, give examples of abstract 'still life' and experiment; though the Russian Kandinsky (1866–1944) (q.v.) is often regarded as the main pioneer of complete abstraction. In England Wyndham Lewis, Ben Nicholson, Barbara Hepworth, and Henry Moore are among those variously influenced by abstract theory. It is the longest-lived of the modern tendencies, and recent years have seen fresh developments, e.g. 'Tachismo' (q.v.). See G. Duthuit, *Abstract and Cubist Art*, 1937.

Abstraction is an act of the mind by which it directs its attention to particular attributes of an object or objects without regard for the other attributes which the object may possess. Thus in the objects coal, pitch, Negro, we see the quality of blackness, and this we may abstract from among the other qualities or attributes in the objects and consider it independently. All names of classes, inasmuch as the individual members cannot be identical, are formed by a process of abstraction—thus the word *ship* connotes a certain number of attributes, and all objects possessing these attributes fall under the heading ship. The

higher the abstraction the greater number of objects embraced. Abstraction, then, is formation into classes and species. The highest abstractions are *time*, *space*, and *being*. Abstraction involves such generality that abstract reasoning may be fallacious if attention is not held continually to concrete objects. See GENERALISATION.

Abstrudum, Reductio ad, method of proof in which it is initially assumed that the proposition which it is desired to prove is not true. If it can then be shown that this assumption leads logically to a self-evident contradiction or 'absurdity,' it will have been proved that the original proposition must be true.

Abstyrtus, Apsyrtus, son of Aëtes, see ARGONAUTS.

Ahu Abdullah Mohammed, see IBN BATUTA.

Abu Bekr, father of Mohammed's favourite wife and his first successor; a well-to-do citizen of Mecca, he was one of the early believers in the new prophet, a pillar of strength to the young community, and was chosen to accompany him when he fled to Medina. When Mohammed d. rivalry between the Emigrants, the men of Mecca, and the Helpers, those of Medina, threatened the new state, but Umar (who was to be the second caliph) did homage to A. B., and all present did likewise. Most of the Arab tribes felt that the death of Mohammed released them from any obligations to Medina, especially the payment of the religious tax, and danger threatened. Mohammed had prepared an expedition against Syria, and A. B., against the advice of all, insisted on sending it. His reign lasted only 2 years, but he saw the supremacy of Islam restored in Arabia and the beginning of the conquest of Syria and Persia. He d. in 634.

Abu Klea, Sudan, vil. on the route from Korti to Metemma, where an Eng. army under Sir H. Stewart defeated the forces of the Mahdi, 17 Jan. 1885.

Abu-Maaschar, see ALBUMAZAR.

Abu Mansur, see DAQIQI.

Abu Nuwas (c. 760–810), lyric and erotic Arabic poet of partly Persian descent. He was educ. at Basra, spent a year in the desert among the Arabs, and later lived under the protection of Caliph Harun al-Rashid in Baghdad. The *Divan des Abu Nuwas*, trans. by A. von Kremer, was pub. in Vienna in 1855; in the original in Cairo in 1860; and in Beirut in 1884.

Abu Shahrain, see ERIDU.

Abu-Simbel, in Lower Nubia, site of two famous rock-cut Egyptian temples dating from Rameses II.

Abu'l-Ala al-Ma'arri (973–1057), Arabic poet, letter-writer, and lecturer. Though blinded in his youth, he attended the lectures of the best contemporary teachers at Aleppo, Antioch, and Tripoli. The last of a school of Syrian writers in Arabic, he was a great humanist, distinguished by his hatred of injustice, hypocrisy, and superstition. Works include poems under the title *Saqt us-Zand*; later poems, the *Luzumiyyat*; and a collection of letters.

Abulcasis, **Albuacasis**, or **Abu'l Qasim** (936-1013), Sp. physician and surgeon, b. at El Zahra, near Cordova. He wrote a great encyclopaedia of medicine and surgery in 30 books or sections, entitled *Alusuri*, the surgical section being the first independent work on the subject and the first to contain illustrations of surgical instruments; it had a great influence on medieval medicine.

Abulfaraj, or **Abulpharagius**, **Gregory Bar Hebraeus** (1226-86), the last of the great Syriac writers. He was b. in Malatya, the son of a doctor of Jewish descent. Like so many scholars in the Middle Ages he took all learning for his prov. and wrote both in Syriac and Arabic. In 1246 he was made bishop of the little tn of Gubos and he d. as maphrian (the highest rank under the patriarch) of the Eastern Jacobites. His books of most general interest are the *Ecclesiastical Chronicle* and the hist. of the world, important for his own time, in two forms, one Syriac and one Arabic for Muslim readers.

Abulfeda (1273-1331), Arabian historian and geographer, b. Damascus, and while a youth distinguished himself in the campaigns against the crusaders and the Tartars. The Mameluke sultan Nasir raised him to royal rank in 1310, making him governor of the kingdom of Hamah, which he ruled as an independent ally of Nasir. Of his numerous works the 2 best known are a universal hist. and a treatise on geography. The hist. is of special value, and one of the chief sources of information concerning the Saracens.

Abumeron, see **AVENZOAR**.

Abuse, legal term. *A. of Distress*, i.e. in an irregular manner to make use of goods distrained on, as, for example, by working a horse, is an offence which makes the offender liable to an action for damages. *A. of Process*, i.e. the bringing of vexatious actions, is guarded against by certain rules of the Supreme Court, notably Order XXV, Rule 4, and by the Vexatious Actions Act, 1896. By the former rule a court can dismiss an action which appears to be of a frivolous nature, and by the latter Act, on an application made by the attorney-general, any person who habitually institutes legal proceedings without reasonable cause may be restrained from so doing by an order of the court. By the common law of England any sufferer from a malicious action either in the criminal or bankruptcy court has the right to bring an action to recover damages.

Abushehr, or **Abushire**, see **BUSHIRE**.

Abutilon (Arabian *aubutilun*), or Indian mallow, a genus of plants belonging to the Malvaceae of which 80 species are known. They are tropical or semitropical, but during the warmest part of the year may be grown in the open air in England. *A. avicennae*, or velvet-leaf, is grown largely in China for jute.

Abutment, technical term used in architecture to denote that part of an arch which receives the lateral pressure, and in machinery to indicate that point at

which resistance is obtained. Thus the breech of a gun, the end of a steam cylinder, are the *A.s* to the explosive or expanding force.

Abuttals, buttings or boundaries of land or of a par. The ceremony of 'beating the bounds' sometimes performed consists in a priest making a tour of his par. and striking each abuttal with a wand.

Abydenus, Gk historian whose hist. of Chaldaea, or Assyria, has been lost except for some fragments quoted by Eusebius and others of the early Fathers of the Church. His date is uncertain, but cannot be placed earlier than 250 bc.

Abydos: 1. Anct tn on the Asian shore of the Hellespont, or Dardanelles. Facing it on the European side was Sestos. Here it was that in 480 bc the Persian monarch Xerxes built his famous bridge of boats to enable his immense army to cross. The bridge, which is described by Herodotus, was nearly a mile long. *A.* will always be remembered for its association with the legend of Hero and Leander. Byron, in his poem *The Bride of Abydos*, recalls this story. See Herodotus, vii. 34-9.

2. Sacred city in Upper Egypt, where the kings of the 1st and 2nd dynasties were buried. Later one of their tombs was thought to be the tomb of Osiris, so all Egyptians wished to be buried there. There were temples of all periods, the best known being that of Seti I, in which is the 'Table of *A.*', a list of all the kings preceding Seti, which is of great historical importance.

Abyla, or **Abila**, one of the Pillars of Hercules (q.v.) on the African shore of the Straits of Gibraltar.

Abyssal (from Gk *a-*, without, *bussos*, bottom) **Fauna** is one of the 3 divs. of marine fauna, the others being littoral or shallow-water, and pelagic or surface fauna. They exist in the greatest depths of the ocean, from about 1000 to 5000 fathoms.

The uniform coldness of temp., total absence of light, and the enormous pressure of water naturally cause great modifications among them. Many are blind, while others see by means of the phosphorescent glow emitted from their own bodies and those of other fish. Their organs of touch are frequently highly developed. As no plants can grow in the abyssal depths because of want of light, the fauna are carnivorous, catching in their wide jaws the falling debris of the organisms which exist above them. In colour they are very vivid, scarlet, violet, orange, and purple being the predominant colours, but not blue. W. European coastal *A. F.* include various sponges, certain coelenterates (including sea-pens, gorgonians, madreporian corals, and sea anemones).

In their discovery the researches of H.M.S. *Challenger*, sent out 1872-6 by the Brit. Gov., are invaluable. See H. N. Moseley, *Notes by a Naturalist on the 'Challenger'*, 1879; Sir Chas. Wyville Thomson and Sir John Murray, *Reports*

on the *Scientific Results of the Voyage of H.M.S. 'Challenger'*, 1880-96; F. B. Sumner, *Intensive Study of Fauna and Flora of Sea Bottom*, 1908; J. Murray and J. Hjort, *The Depths of the Ocean*, 1912; J. A. Thomson, *Haunts of Life*, 1921.

Abyssinia, see **ETHIOPIA**.

Abyssinian (Ethiopian) Church, The, founded in the time of St Athanasius, who sent them their first bishop. Their Metropolitan, called *Abuna*, 'our Father,' has always been appointed by Alexandria, which, to prevent the election of an independent Patriarch, has limited their episcopate to seven. This has prevented them from evangelising Africa. They became Uniats (q.v.) for a few years in 1626 under Jesuit influence; but in 1632 the Jesuits were expelled, and the Church reverted to its Coptic allegiance and monophysitism (q.v.). The It. occupation of Ethiopia hardened their antagonism to Rome. See B. J. Kidd, *The Churches of Eastern Christendom*, 1927.

Acacia, genus of trees and shrubs, usually thorny, belonging to the subfamily Mimosoidae of the order Leguminosae. The hardy tree commonly known as *A. is false A. or robinia* (q.v.). The true genus comprises over 500 species, found chiefly in the equatorial zone and in subtropical regions of Australia and Africa. The *A. julibrissin*, however, is grown in the open air in some parts of France and the warmer European countries, and is remarkable for its clusters of beautiful pink flowers. The leaves of the genus are normally bipinnate, but are subject to modification, and the flowers grow in a head. The Australian 'wattles' are *A.s* in which the leaf blade is absent, but the leaf-stalk has flattened into a phyllode with the edge presented to the light, and a thick epidermis which prevents transpiration. In America the fruits of the edible *A.* are used as food; in the Is. of Mauritius and Réunion the leaves of *A. lebbek* serve as soap. *A. arabica* is used in tanning and gives gum arabic, while gum senegal comes from *A. senegal*. The drug catechu is prepared from *A. catechu*.

Acacia, False, see **ROBINIA**.

Acacia, Three-horned, see **HONEY-LOCUST TREE**.

Acacius (340-65), Bishop of Caesarea, surnamed Monophthalmus (Gk. 'one-eyed'), founded an Arian sect known as the Acacians. His doctrine was that Christ is not of the same substance as God, but merely resembles Him.

Academic Legion, armed troop of Viennese students who joined in the revolution of 1848.

Académie Française, see **INSTITUT DE FRANCE**.

Academus, mythical Attic hero, who revealed to Castor and Pollux the hiding-place of their sister Helen. The *academia* where Plato taught was named after him.

Academy (Gk *Akademeia*), park in the Ceramicus, a W. suburb of Athens; so called after the hero Academus. A gymnastic school was held there; purchased by Cimon, son of Miltiades, who

adorned it with statues and olive plantations and left it to the public. A favourite walk of Socrates and his disciples, it was afterwards famous because Plato, whose home was in the neighbourhood, taught there; his followers soon came to be called *Academici*, and academic philosophy was synonymous with that of Plato. There was after Plato's death some variation in the system, causing the following distinctions to be made: the Platonic A. under Plato, 398-347 BC; the Ancient A. under Speusippus, Xenocrates, and Polemo (qq.v.); the Middle A. under Arcesilaus (q.v.); and the New A. under Carneades (q.v.). Two more *A.s* were founded after these: the Fourth A. by Philo of Larissa, and the Fifth A. by Antiochus of Ascalon, which terminated 79 BC. Ptolemy Soter (q.v.) had endowed a museum, which was essentially an A., at Alexandria, 314 BC. Charlemagne, at the suggestion of Alcuin, estab. a school or institute resembling an A. in AD 796 at St Martin's, Tours. Until the time of the Renaissance most of the learning was to be found in the monasteries, some of which might be regarded as *A.s*. After that period most learned bodies were called *A.s*. The following is a list of *A.s* arranged alphabetically, with the dates of their estab.: *Ancona*, Caliginosi, 1642. *Berlin*, Akademie der Wissenschaften, 1700, founded by Frederick I; *Architecture*, 1799. *Bologna*, Eccles., 1687; *Mathematics*, 1690; *Sciences and Arts*, 1712. *Boston, U.S.A.*, A. of Arts and Sciences, 1780. *Brescia*, Erranti, 1626; A., 1801. *Brest and Toulon*, Military, 1682. *Brussels*, Académie Royale, 1773. *Bucharest*, Rumanian A., 1866. *Caen*, Belles Lettres, 1705. *Chicago, U.S.A.*, Sciences, 1865. *Copenhagen*, Sciences, 1742; *Beaux Arts*, 1754. *Cortona*, Antiquities, 1726. *Dublin*, Royal Irish A., 1782; Royal Hibernian A., 1803. *Edinburgh*, Royal Scottish A., 1826. *Erfurt*, Saxony, Sciences, 1754. *Faenza*, Philoponi, 1612. *Florence*, Fine Arts, founded by Brunetto Latini, 1270; *Platonica*, founded by Lor. de' Medici, 1474 (dissolved 1521); *Della Crusca* or *Furfuratum*, 1582; *Del Cimento*, 1657; *Georgofili*, 1752 (agric.); *Antiquities*, 1807. *Geneva*, Medical, 1715. *Genoa*, Painting, etc., 1751; *Sciences*, 1783. *Göttingen*, Gesellschaft der Wissenschaften, 1752. *Haarlem*, Sciences, 1760. *Helsinki*, Societas Scientiarum. *Istanbul*, A., 1851. *Leipzig*, A., 1768. *Leningrad*, A. of the U.S.S.R., formerly known as the Imperial, 1728. *Lisbon*, Portuguese A., 1779. *London*, Royal Soc., 1662; Royal A. of Arts, 1768; Royal A. of Music, 1823; Brit., 1902. *Lyons*, Sciences, 1700. *Madrid*, Royal Sp., 1713; Hist., 1730; Painting and the Arts, 1753. *Mannheim*, Sculpture, 1775. *Mantua*, Vigilanti (Sciences), 1704. *Marseilles*, Belles Lettres, 1726. *Massachusetts*, Arts and Sciences, 1780. *Milan*, Sciences, 1719; A., 1838: *Architecture*, 1880. *Modena*, Società Italiana delle Scienze. *Munich*, Arts and Sciences, 1759. *Naples*, Rossana, 1540; *Secretorum Naturae*, 1560; Sciences, 1695; *Herculaneum*, 1755;

Nuova Società Reale, 1808. *New York*, Literature and Philosophy, 1814; *Amer. Geographical Society*, 1852; *National A.*, 1863; *Sciences*, 1876 (founded as *Lycæum of Natural Hist.*, 1818). *Newhaven, U.S.A.*, Connecticut A. of Arts and Sciences, 1799. *Nîmes*, Royal A., 1683. *Oslo, A.*, 1837. *Padua*, Poetry, 1610; *A.*, 1779; *Sciences*, 1792. *Palermo*, Fine Arts, 1300; *Medical*, 1645. *Paris*, Académie Française, 1635; Académie Royale de Peinture et de Sculpture, 1648; Académie de Peinture, by Le Brun, 1648; Académie des Inscriptions, 1663; Académie Royale des Sciences, by Colbert, 1666; Académie Royale d'Architecture, 1671; all suppressed in 1793; in 1795 Institut National was founded. This was divided into 4 parts in 1803, and in 1816 some of the original names were restored to these 4 parts by Louis XVIII: (a) Académie Française; (b) Académie des Inscriptions et Belles Lettres; (c) Académie des Sciences; (d) Académie des Beaux Arts; and in 1832 Académie des Sciences Morales et Politiques. *Parma*, Innominati, 1550. *Pennsylvania*, A. of Fine Arts, 1805. *Perugia*, Incensati, 1561. *Philadelphia, U.S.A.*, Philosophical Society for Promotion of Useful Knowledge, 1743; *Natural Sciences*, 1812. *Rome*, Lincei, 1609; Uomini, 1611; Fantastici, 1625; Infecondi, 1633; *Painting*, 1656; *Arcadi*, 1656; *Eng.*, 1752; *Nuovi Lincei*, 1847. *St Louis, Miss.*, A. of Science, 1857. *Stockholm*, Sciences, 1741; *Belles Lettres*, 1753; *Agric.*, 1781. *Toulon*, Military, 1682. *Trondhjem*, A., 1760. *Turin*, A. of Sciences, 1757; *Fine Arts*, 1778; *Royal Institute*, 1783. *Uppsala*, Royal Society, 1720. *Venice*, *Medical*, 1701; *A.*, 1831. *Verona*, *Music*, 1543; *Sciences*, 1780. *Vienna*, Kaiserliche A., 1487; *Sculpture and Arts*, 1705; *Surgery*, 1783; *Oriental*, 1810. *Warsaw*, *Language and Hist.*, 1753. *Washington, D.C.*, Smithsonian Institution, 1846; *National Geographical Society*, 1888; *International A. of Sciences, Arts, and Letters*, 1910.

See J. L. Myres, *Learned Societies. A Lecture*, 1922.

'Academy, The,' former well-known literary and artistic monthly jour., founded by C. E. C. B. Appleton, 1869. Among the many famous men who contributed to its early pages were Matthew Arnold, W. M. and D. G. Rossetti, F. T. Palgrave, Wm Morris, and W. W. Skeat. It became a fortnightly (1871) and finally a weekly periodical (1874). It ceased pub. in 1909.

Academy of Arts, Royal, London. Attempts had been made by the prin. artists in Britain prior to the accession of George III to form a permanent A. for the cultivation of painting, sculpture, and architecture, but they had failed. In 1760, however, with the assistance of 'The Royal Society for the Encouragement of Arts, Manufs., and Commerce in Great Britain' (see ROYAL SOCIETY OF ARTS), the artists opened the first public exhibition which attracted public attention. In 1765 a charter was obtained from the king, and the society became

'The Incorporated Society of Artists.' This, however, was not entirely successful, and a memorial signed by 22 artists was presented to the king asking for his sanction and encouragement for a gratuitous national school of art. The king approved, and 'The Royal Academy of Arts in London, for the purpose of Cultivating and Improving the Arts of Painting, Sculpture, and Architecture' was founded, 10 Dec. 1768. Sir Joshua Reynolds was appointed president; G. M. Moser, keeper; F. M. Newton, secretary; E. Penny, prof. of painting; T. Sandby, prof. of architecture; J. Wall, prof. of perspective; Dr William Hunter, prof. of anatomy. Its first quarters were in Somerset House, but when old Somerset House was purchased by the nation a part of the new building was given to the society. It took possession of its new quarters in 1780, and the first exhibition was held in 1781. In 1836 it was removed to Trafalgar Square, and it was afterwards removed to Burlington House, Piccadilly, its present quarters. It consists of 40 academicians, painters, sculptors, engravers, and architects; 30 associates; and sev. honorary members. An exhibition of works by living artists is held every summer from the first Monday in May to the first Monday in Aug., and an exhibition of works by old masters every winter from the first Monday in Jan. for ten weeks. There are schools which give instruction in art, and all persons who have passed the required examination are admissible as students of the A. An exhibition of 'The First Hundred Years of the Royal Academy' held at the Academy, 1951-2, gave an impressive survey of works originally shown between 1769 and 1868. See Blackburn, *Academy Notes*, 1875-1900; Laidlaw, *Royal Academy*, 1898; Hodgson and Eaton, *Royal Academy and Members, 1768-1830*, 1905; Graves, *Royal Academy Dictionary, 1769-1904*, 1905-6; Lamb, *The Royal Academy*, 1935. In France, the Académie Royale de Peinture et de Sculpture, founded by Louis XIV in 1648, perished with the old regime. The Amer. A. is the National A. of Design, founded 1826; it admits 125 painters, 25 sculptors, and 25 architects and engravers.

Academy of Arts and Letters (America) is a select body of men distinguished in the realms of literature, painting, and music. It had its origin in the National Institute of Arts and Letters, and its object was the furtherance of all 3 of these arts. The first 7 members of the A. elected in 1904 were William Dean Howells, Augustus Saint-Gaudens, Edmund Clarence Stedman, John Le Farge, Samuel Langhorne Clemens (Mark Twain), John Hay, and Edward A. MacDowell. The hon. offices are in 633 West 155th Street, New York.

Acadia, or Acadie, see NOVA SCOTIA.

Acadia National Park, gift to the U.S. Gov. This park consists of 44 sq. m. on Mt Desert Is. off the coast of Maine, with part on the Schoodic Peninsula and part on Isle au Haut. The name was

changed from Lafayette National Park in 1929. It contains many lakes, and was restored as far as possible to its pristine condition by reforestation by the U.S. Forest Service. The forests were heavily damaged by fire in 1947.

Acajutla, port serving W. and central areas of El Salvador, central America, on the Pacific Ocean. Pop. 2500.

Acalephae (from Gk *akalēphē*, a sea-nettle), name given by Aristotle to the jelly-fish tribe because of their stinging properties. Cuvier covered with the term the Acraspeda, Lucernarida, and Ctenophora, but the nomenclature has since been altered.

Acampichtli (Aztec, 'handful of reeds') (d. probably in 1403), the first king of the Aztecs of Mexico. He constructed canals and built stone edifices, and generally improved the conditions of his kingdom.

Acanthaceae, family of dicotyledonous plants, mostly tropical herbs and shrubs with 5- or 4-parted flowers often in racemes or clustered in leaf-axils, showy and sometimes enclosed in large bracteoles, and capsular fruits, often explosive. Genera include *Acanthus*, *Aphelandra*, *Beloperone*, *Dianthera*, *Fitonias*, *Hygrophila*, *Jacobinia*, *Odontonema*, *Ruellia*, *Schaueria*, *Thunbergia*, and *Whitfieldia*.

Acanthocephala (Gk *akantha*, a thorn, *cephalē*, a head), class of parasitic worms of which the *Echinorhynchus* is the chief genus. The largest species, *gigantorhynchus*, is found in the pig, and may attain a length of more than a yard, but most species are less than 1 cm. in length. It has a cylindrical body with a proboscis furnished with many hooks by which it attaches itself to the intestine of its host. When the embryo is born it is ejected from the body of the host and depends for its further development on being swallowed by an intermediate host, which in the case of *E. gigas* of the pig is the larva of a particular beetle. It continues in these surroundings for a time, but only reaches adult proportions if the intermediate host is eaten by a pig, its permanent host, when the cycle begins again.

Acanthodians, primitive Palaeozoic placoderms (q.v.) which looked like small 'spiny sharks.' The head was covered by dermal bones, and the body with bony scales; the fins were stiffened anteriorly by spines, and there were frequently additional pairs of fins. The tail was heterocercal. *A.* lived from Silurian to Permian times.

Acanthopterygii (from Gk *akantha*, a thorn; *pteryx*, a wing), one of Cuvier's 3 primary divs. of fish, those in this section having spinous rays in the dorsal, anal, and pelvic fins.

Acanthurus (from Gk *akantha*, a thorn; *oura*, a tail), genus of percomorph fishes found in tropical seas. They are known as surgeon-fishes, having on each side of the tail a movable, lancet-like spine.

Acanthus, in architecture, is the sculptured leaf which is the distinguishing characteristic of a Corinthian capital. The *A. mollis* growing on a tomb probably

suggested this ornamentation to Callimachus in the 5th cent. BC.



Greek ACANTHUS Roman

Acanthus (Brankursine or Bear's Breech), genus of Mediterranean perennials, family Acanthaceae, of which *A. mollis* has naturalised as a garden escape in Cornwall, and *A. caroli-alexandri* is a fine rock garden plant from Greece.

Acapulco, seaport of most important state of Guerrero, SW. Mexico, on the Pacific coast, 282 m. from the cap. Exports consist of hides, timber, and fruit. Pop. 10,000.

Acarides (from Gk *akarēs*, small; *eidos*, form), or *Acarina*, are a low order of the Arachnida, vulgarly known as mites. The body is usually globular and presents no exact div. between the abdomen and cephalo-thorax. The organs are simple, and the mouth is adapted for biting or sucking. The *Sarcoptes scabiei* produces gall. *Tyroglyphus siro* is the cheese-mite. See also MITES.

Aacarnan, son of Alcmaeon and Callirhoe, daughter of river-god Achelous. He avenged his father's death by slaying the sons of Phegeus, and became the eponymous hero of the Acarnanians.

Acarnania, dist. of ant. Greece, bounded on the N. by the Ambracian Gulf, now the Gulf of Arta, and Aetolia, and on the W. and SW. by the Ionian Sea. It was inhabited by a piratical race, which formed a league and had for its cap. Stratus, a tn situated on the R. Achelous. It was subdued by the Macedonians in 225 BC. In 146 it became part of the Rom. prov. of Achaia, and to-day it forms with Aetolia a prov. of modern Greece.

Aoastus, King of Iolcus, an Argonaut, who on his return from Colchis instituted funeral games in honour of Pelias, his father, whom his sisters had killed on the advice of Medea, who had promised to restore him to life as a young man. *A.* was dethroned and killed by Peleus. See Ovid, *Metam.* vii. 297-349.

Acatalectic, term in prosody meaning 'not catalectic,' i.e. a normal line of the full number of syllables, without shortening. See CATALECTIC.

Acatalepsy (Gk alpha-privative and *katalambanein*, to seize), name of the doctrine of Arcesilaus (3rd cent. BC), a Gk philosopher, who maintained, in opposition to the Stoics, that there can be no criterion of truth. The Sceptics apply the term to incomprehensibility.

Acatus (dimin. *acatium*), small boat, swift and light, propelled by wind or oars, used by the anct Gks, particularly by pirates. It bore a spike in the front and was curved at the prow.

Acca Larentia, or **Laurentia**, a Rom. deity, wife of Faustulus, shepherd of Numitor, and foster-mother of Romulus and Remus. Another legend made her a courtesan who married a rich Etruscan named Tarutius, and left her wealth to the Rom. people.

Accad, see **AKKAD**.

Accademia, Venice, the central gallery of Venice, on the Campo di Carità. In it may be studied the whole sequence of Venetian art from the 14th cent. onwards, from Lorenzo Veneziano to the Bellinis (Giovanni and Gentile) to Carpaccio and Cima and so to the great period of Titian, Giorgione, Tintoretto, Palma Vecchio, Lotto, Paris Bordone, and down to Tiepolo. One of the outstanding possessions of the Accademia is the splendid series of paintings by Carpaccio on the legend of St Ursula. Next to these may be seen the series of Giovanni Bellini's Madonnas, one of them, 'Madonna with the Magdalen and St Catherine' being equal to his work in the National Gallery. The finest of Titian's paintings here is his 'Presentation of the Virgin.' Two other great treasures are the dramatic 'Miracle of St Mark' of Tintoretto and the splendid composition, 'The Feast in the House of Levi,' by Paul Veronese. With Tiepolo the greater days were past, but much excellent work is to be seen in the Venetian views of Canaletto and Guardi.

Accalia, Larentalia, or **Larentinalia**, Rom. funeral festival on 23 Dec. in honour of Acca Larentia (q.v.).

Accelerando (It.), musical term to indicate the quickened movement of a passage.

Acceleration, rate of change of velocity. Like velocity it is a vector (q.v.), and to be fully specified must be assigned a direction and sense as well as a magnitude. A force acting on a body produces a change of velocity in the direction of the force, if the body is free to move, i.e. the body suffers an A. in the given direction. If the speed is reduced the effect is known as retardation. A common example of A. arises from the action of gravity on a body. The force acting between the earth and the body causes an A. of about 32 ft. per sec. per sec. (c. 981 cm. per sec. per sec.). From the equation of motion $v = u + gt$, where u is the initial velocity and v the velocity after an A. g has acted for a time t , it is seen that a body falling freely from rest has a velocity of 32 ft. per sec. at the end of the first sec., 64 ft. per sec. after two sec., and so on. See **MECHANICS**.

Accent is the stress with which a certain syllable of a given word is pronounced, in comparison with the other syllables of the same word. In a long word, however, there are frequently two A.s, but they need not be equally emphasised; as in the words *manufacture* and *independent* and in the phrase 'On the top of the hill' the first A. is comparatively faint.

For anct A., especially the Gk, see **METRE**. The A. of some words is variable and has undergone changes. Thus we say *triumph*, while Milton said *triumph*, the noun and the verb being distinguished by him as we distinguish nowadays *produce* the noun and *produce* the verb. Comparatively recently *advertisement* has become *advertisment*. The tendency, due to a desire for rapid speaking, is to throw the A. back. The symbols used in Gk to denote A. are three: the acute (´), the grave (`), and the circumflex (˘). Originally these A. marks indicated a distinct difference of musical pitch in pronouncing the syllables of a word, those having the grave A. being pronounced at a comparatively 'low pitch,' those having the acute A. being a 'musical fifth higher.' Those having the circumflex started in the high pitch and descended 'a fifth' during the pronunciation of the same syllable. In later times, however, the A.s represented mere stress. The A. has different meaning in language, prosody, poetry, music, and script. Some scripts such as It., Fr., Sp., Polish, Czech, and so on have numerous A. signs, which are employed as diacritical marks for letters (ä, é, ö, ê, ü, ê, etc.).

Accent, in mathematics: 1. A mark placed at the right hand of a letter and above it to signify different magnitudes of the same kind, e.g. $a, a', a''; x, x', x''$.

2. In trigonometry to express the minutes and seconds of a degree, e.g. $8^{\circ} 10' = 8 \text{ min. } 10 \text{ sec.}$

3. To express feet and inches, e.g. $2' 6'' = 2 \text{ ft } 6 \text{ in.}$

Accent, in music, is the regular emphasis occurring in a series of notes. It is usually placed on the first beat after the bar-line, and in any music divided into bars of more than 3 beats there is usually a secondary A. less strongly stressed.

Accentor (Prunellidae) (Lat. *ad*, to; *cantor*, singer), family of small passerine birds, probably related to the thrushes. Usually found in thickets in hilly districts. Represented in Great Britain by the hedge-sparrow.

Acceptance, Acceptor, see **BILL OF EXCHANGE**. For acceptance in the law of sale of goods see **SALE**.

Acceptation in Rom. and Scots law meant the remission of a debt by a creditor giving a receipt for money never actually paid. The word was used in theological controversy by the Arminians for the doctrine that the sufferings of Christ were not sufficient atonement for man's sins, albeit graciously accepted by God.

Accession, Deed of. In Scots law, the creditors of a bankrupt or other insolvent person can by a deed approve of, and bind themselves to concur in, the administration of his estate in trust for the general good.

Accession of Property. In the law of England and Scotland, derived from the Roms., property added to either naturally or artificially is said to be acquired by A. All accretions to property naturally added belong to the owner of the nuclear property; thus the offspring of animals,

the produce of the soil, the increase of land due to alluvial deposits, belong to the owner whose land has been added to or whose fields or cattle have been fruitful. Property, acquired artificially, as, for example, when a man builds a house on another's land or embellishes or works on another's material, was generally under the Rom. law held to be the property of the owner of the prin. thing, provided compensation was made for improvement. An exception was made in cases where as the result of labour (which, of course, is a form of property) a totally new thing was produced. Thus the man who made wine from another's grapes, or painted a picture on another's canvas, retained the wine and the picture and compensated the owners of the grapes and the canvas, thereby reversing the usual rule. In the U.S.A. all A. or accretion is, in the absence of any agreement to the contrary, the property of the owner of the prin. materials.

Accessory. In Eng. law, an A. is one who, though not the principal in a felony, and even absent at the time of commission, has nevertheless been concerned with the crime, either *before* or *after* the fact. An A. *before* the fact has been defined by a dictum of Lord Hale as one who, 'being absent at the time of the crime committed doth yet procure, counsel, or command another to commit a felony.' An A. *after* the fact is one who, knowing that a felony has been committed, assists, relieves, or protects the felon. The mere knowledge that a felony is about to be committed or the omission to apprehend or report the felon does not constitute accessory, and a distinction must be made between A.s and principals in the second degree who are present aiding and abetting. There are no A.s in a case of misdemeanour or of treason; all persons concerned are held as principals and generally receive the same punishment. In Scots law, except for treason, A. after the crime is not recognised, and in the United States the distinction of the Eng. common law between principal and accessory has by statute been abolished, every person concerned being liable to punishment as a principal. See CRIMINAL LAW.

Acciacatura (It. *acciaccare*, to crush), in music, an auxiliary note played as grace-note, played simultaneously with the prin. note and immediately released. In modern music it has been entirely superseded by the appoggiatura (q.v.).

Acciajuoli, Donato (1428-78), It. scholar, b. Florence, who wrote lives of Hannibal, Scipio, and Charlemagne, and commentaries on Aristotle's *Ethics* and *Politics*.

Accidence, corruption of accidents, signifying the properties and qualities of the parts of speech, as gender, number, and case; originally a small book containing these, but now used to express that part of grammar which deals with inflections (q.v.).

Accident means any extraordinary or unforeseen event. In the law of torts 'inevitable A.' is the antithesis of negligence, and, generally speaking, involves

no liability in damages. The word, however, varies in its legal connotation according to the context: thus, in the criminal law, it means an act done unintentionally and in such circumstances that no person of common prudence could very well have avoided it.

In insurance practice, however, the word A. includes occurrences brought about by the negligence of the insured or assured and of other or third parties. (See INSURANCE, *Casualty and Contingency Insurance*.) In the law of employers' liability the word is also loosely used to include not only events accidental in a popular sense but, for the purposes of statutory compensation, others which are in no sense fortuitous. See also ACCIDENTS, MOTORING, and WORKMEN'S COMPENSATION.

Accident, metaphysical term defined by Aristotle (1) as 'that which belongs to a thing and is truly stated of it, but not necessarily nor even usually', and (2) as 'that which belongs to a thing *per se*, though no part of its essence'. The word is used of all qualities as distinct from substance (q.v.).

Accidentals, in music, are signs occurring before a particular note, not in the signature, which change the pitch during the course of a bar. These signs are the flat, double-flat, sharp, double-sharp, and the natural.

Accidents, Motoring. In the case of an accident causing damage to any person, vehicle, or animal, the driver of the motor vehicle must stop, and on request of any person having reasonable grounds for so requiring, give his name and address and identification of his vehicle. If this is not done on the spot, then the accident must be reported at a police station or to a constable as soon as possible, and in any case within 24 hours. Hospitals now have a right to claim the reasonable expenses of hospital treatment from the insurance company which is meeting claims under a third party insurance policy. See INSURANCE and ROAD SAFETY.

Accipiter (Lat. *accipiter*, hawk), Raptores, or Rapaces, the common name for all birds of prey, now generally put in the order Falconiformes. They appear by day and by night, and are recognisable by their crooked and powerful beaks and talons.

Accius, Lucius (170-c. 85 BC), Rom. tragic poet. He wrote more than 40 tragedies on Gk. but only 2 on Rom. themes. Only fragments survive. See text and trans. in E. H. Warmington's *Remains of Old Latin*, II (Loeb Library), 1936, and W. Beare, *The Roman Stage*, 1950.

Acclimatisation, the adaptation of plants, animals, and mankind to the difference in climate experienced in some place other than the native country. It differs from *domestication*, which implies protection, and from *naturalisation*, which implies mere residence in another country, in the fact that it requires adaptation. It is made difficult of study in that many other factors are present which would

bring about or prevent any change in the original nature of the plant or animal under observation, e.g. changed conditions in food, increase of enemies, and in man intermixture of races. One of the common products of A. in all kinds of organic life seems to be fertility, which can be noted in many cases; in others, however, the reproductive element is limited, as in some plants which lose all power of sexual reproduction when transferred to varying climates, and propagate only vegetatively. The fertility of adapted animals has sometimes proved a great disadvantage to the adopted country, the introduction of rabbits into Australia and their subsequent degeneration into a pest being a case in point.

It has been maintained by some scientists that man is incapable of adaptation, but there are many evidences to the contrary among peoples who have spread successfully over many parts of the world from a single source (e.g. the Jews, Indians in the W. Indies, E. Africa, and Fiji, Brit. and Dutch colonists, Negroes in the New World). However, such adaptation is not always successful, and diseases which are comparatively harmless to natives of a country frequently prove fatal to strangers, e.g. malaria and liver complaints affect Europeans in the tropics, while lung troubles are common in Africans transferred to colder climates.

In France a society was founded in 1854 by Isidore Geoffroy Saint-Hilaire for the practical and theoretical study of this subject, and the Société Nationale d'Acclimatation has adapted species and receives assistance from the Jardin Zoologique d'Acclimatation. London has the Zoological Gardens and Kew Gardens, in which A. can be seen in animals and plants respectively. See I. G. Saint-Hilaire, *Acclimatation et domestication des animaux utiles*, 1861; Chas. Darwin, *The Variation of Animals and Plants under Domestication*, 1868; J. Hann, *Handbuch der Klimatologie*, 1897; B. E. Livingston, *Climatic Areas of the U.S. related to Plant Growth*, 1913.

Acco, see ACRE.

Accolade (Fr. from It. *accollare*, to embrace; from Lat. *ad*, to, and *collum*, neck): 1. A knight ceremony, used in conferring knighthood. It was supposed that it consisted of an embrace, but is now believed to have been a slight blow with the flat of a sword on the shoulder.

2. In music, a brace used to join several staves.

Accolti, Benedetto (1415-66), It. jurist and writer, b. Arezzo. He became chancellor of the Florentine Rep. in 1459, and held this office until his death. His poem of Godfrey of Bouillon's conquest of Palestine, the *De Bello a Christianis contra Barbaros gesto pro Christi Sepulchro*, 1432, was the basis of Tasso's *Gerusalemme liberata*, 1575.

Accolti, Bernardo (c. 1465-c. 1535), It. poet, son of the jurist Benedetto Accolti, b. Arezzo. He was known as *l'Unico Aretino*. He owed his fame to his powers of poetical improvisation, and when he announced that he would recite his poems

tradesmen closed their shops and flocked to hear him; unfortunately the poems have hardly survived him.

Accolti, Pietro (1455-1549), It. cardinal, brother of Bernardo A., b. and d. Florence. As cardinal of Ancona he had a large share in drawing up the bull against Luther in 1520.

Accommodation, Housing. Apart from an attempt made under the Labouring Classes Lodging Houses Act, 1851, until the Housing of the Working Classes Act, 1890, the provision of housing A. was no one's legal responsibility. Since the passing of the 1890 Act the legislature has placed some responsibility upon local authorities for providing houses for the working classes and dealing with slums. Gradually this power has grown until in the Housing Act, 1949, the responsibility for the housing of all sections of the community was placed upon local housing authorities. The ability of housing authorities to provide such A., however, has tended to depend more and more upon Exchequer subsidies.

GENERAL POWERS AND DUTIES OF LOCAL AUTHORITIES. Housing authorities must periodically review the housing conditions in their areas, and the need of further housing A., and submit to the Minister proposals for meeting the need.

Prior to 1919 houses were principally provided by private enterprise supplemented by: (1) Building Societies; (2) Friendly Societies; (3) Trade Unions; (4) Industrial Co-operative Societies; (5) Philanthropic Bodies; (6) Employers of Labour; (7) Housing Associations; (8) Public Utility Societies; and (9) Local Authorities. Between the two wars approximately four million houses were erected, of which about three million were constructed by private enterprise.

Local authorities may provide A. by: (a) erecting houses on any land acquired or appropriated by them; (b) converting any buildings into houses; (c) acquiring houses suitable for the purpose; (d) altering, enlarging, repairing, or improving any houses or buildings which have, or any estate or interest in which has, been acquired by them. Any house so erected or acquired may be altered, enlarged, repaired, or improved, and supplied with all requisite furniture, fittings, and conveniences.

Local authorities are empowered to acquire for the provision of A.: (a) *any land*, including any houses or other buildings thereon, as a site for the erection of houses; (b) (i) *houses*; (ii) *buildings*, other than houses, being buildings which may be made suitable as houses; together with any land, or any estate or interest in any houses, or in any such buildings; (c) *land* for the purpose of: (i) lease or sale to *other persons* to erect houses thereon; (ii) *lease* or sale for purposes necessary or desirable for, or incidental to, the development of the land as a building estate, including: (1) the provision, maintenance, and improvement of houses and gardens, factories, workshops, places of worship and recreation; and (2) other works or buildings. Acquisition may be by

agreement or compulsorily with the consent of the Minister, and even if not immediately required, provided it is likely to be so required within ten years. The authority may also with the consent of the Minister appropriate land already vested in them to these purposes.

The general management, inspection, regulation, and control of houses provided by a local authority under the Housing Act, 1936, as amended, are vested in and exercised by the authority. It may make such reasonable charges in this connection

Management Commission and transfer to them: (a) the management, regulation, and control; and (b) the repair and maintenance of houses, etc. The Minister must approve the scheme setting up the Commission. The chairman may be remunerated and the Commission may employ their own staff.

It is the duty of the co. council to have constant regard to housing conditions in rural dists., and the rural dist. council may agree to the co. council exercising all or any of their duties.



London County Council

TERRACE HOUSES, ALTON ESTATE, WANDSWORTH

for the tenancy or occupation of the houses as it may determine. It may grant such rebates from rents as it thinks fit. It must review the rents from time to time and make such changes as circumstances require. A differential rent scheme based on the income of a tenant has been held appropriate, but the reasonableness of charges is open to review by the Court. In selecting tenants, preference must be given to persons occupying insanitary or overcrowded A.; to those with large families; and to persons living under unsatisfactory housing conditions. It must further be a term of occupation that the tenant shall not assign or underlet without consent of the authority.

If a local housing authority consider it expedient it may set up a Housing

Although the Housing (Rural Workers) Acts, 1926, 1931, and 1933, were allowed to lapse in 1945, their financial provisions may operate until 1965 and should be considered.

There was a danger that in concentrating on the problems of urb. housing needs, slums, and overcrowding, the needs of the agric. pop. might be overlooked, and these Acts were passed with a view to providing houses for the agric. workers and those whose economic conditions were substantially the same as those workers'. The local authorities were the councils of cos. and co. bors., but the Minister could make the council of a co. dist. the local authority, or the co. council could agree to the co. dist. council exercising the functions. The local authorities could, and had to if required by the Minister, submit

schemes to the Minister for the reconstruction and improvement of houses or buildings for dwellings. Owners could be assisted by loans or grants. There was a limit on the value of the property receiving assistance. The cost of the work had not to be less than £100 or two-thirds of the cost of the improvements, whichever was less, increased to £150 if for the abatement of overcrowding. Grants could be in lump sums or periodical payments spread over 20 years at the most. Loans were secured by mortgage and could not exceed 90 per cent of the security. Exchequer grants to local authorities were 50 per cent of the loan charges on a 20-year basis for reconditioning houses of which they were or became the owners.

POWER OF LOCAL AUTHORITIES TO MAKE ADVANCES, ETC., FOR THE PURPOSE OF INCREASING HOUSING ACCOMMODATION. It is confusing to the uninitiated to understand the two codes under which advances may be made to facilitate the purchase of houses or the construction of houses. The provisions are to be found in the Small Dwellings Acquisition Acts, 1899 to 1923, and the Housing Act, 1949, Section 4:

The Small Dwellings Acquisition Acts, 1899 to 1923. The Act of 1899 contained the original provisions. This code now includes: the Small Dwellings Acquisition Act, 1899; the Housing and Town Planning, etc., Act, 1919, Part III; and the Housing, etc., Act, 1923, as amended by the Housing Act, 1936, Section 92.

The provisions of the code are: (1) A formal adoption of the Acts is required. (2) An advance must not exceed 90 per cent of the valuation. (3) The applicant must undertake to reside in the house constructed or purchased for a period of at least three years, but this condition may be dispensed with at any time by the local authority. (4) The market value of the house must not exceed £5000. (5) The market value must be ascertained by a valuation made on behalf of the local authority. (6) In respect of an advance made for a house in course of construction, it may be made by instalments from time to time as the building progresses, but so that the amount advanced at any time before the completion of the house does not exceed 80 per cent of the value of the work done, including the value of the site. (7) The advances must be repaid with interest over a period of not more than 30 years, although arrangements may be made for repayment before the agreement expires. (8) The interest to be acquired must be the freehold or a lease of not more than 60 years unexpired at the date of purchase. (9) The rate of interest on advances is fixed at 1 per cent above the rate at which the local authority can borrow from the Public Works Loan Board—a rate fixed from time to time by order of the Minister and approved by the Treasury. (10) The property must first be vested in the local authority by mortgage subject to redemption which, under the Act of 1919, Section 49 (d), may be by receipt under seal in the form of the

Fourth Schedule to that Act and having the legal effect specified in Part II of that schedule (Act, 1899, Section 2 (c)). (11) The statutory receipt does not require a stamp (Act, 1919, Section 49, proviso (1)). This apparently has the same effect as that of the Law of Property Act, 1925. (12) An advance can be made in respect of one house only. (13) There is no disqualification from being elected as, or being a member of, the local authority by reason only that an advance has been made under the Act. A member must, however, disclose his interest in this respect to the meeting and must not take part in the consideration of, or voting upon, the subject (Local Government Act, 1933, Section 76). (14) The house must be insured by the mortgagor against fire, kept in good sanitary condition, and not used for the sale of intoxicating liquor. The local authority has adequate powers to enter into possession, and in certain circumstances to sell the house, for breach of conditions. (15) If the cost of administration to the local authority exceeds a rate of one penny and one-third in the pound on the rateable value (co. councils two-thirds of a penny), no further advances must be made for five years or until such cost falls below one penny and one-third (co. councils three-farthings).

The Housing Act, 1949. The Housing Code is now contained in Section 4 of the Act, 1949. The local authorities for Part V of the Act, 1936, including co. councils, may make advances under the Act, 1949, Section 4, as under the Small Dwellings Acquisition Acts with the following modifications. The applicant need not undertake to reside in the house. The leasehold interest need only be such as exceeds the term of the loan by ten years. There is no restriction regarding the sale of intoxicating liquors or the insurance of the premises, but of course such conditions may be incorporated in the mortgage deed. There is no limit to the amount which can be advanced during construction, or to the rate limit on the expenditure of the local authority. Further, advances may be made not only for the acquisition or construction of houses but for: (1) converting into houses buildings which have been acquired, or acquiring buildings and converting them into houses; or (2) altering, enlarging, repairing, or improving houses, whether the houses or buildings are within or outside the area of the authority.

HOUSING ASSOCIATIONS. The power of local authorities and co. councils to promote and assist housing associations includes making grants or loans to them; subscribing towards any share or loan capital; and guaranteeing to join in the payment of principal or interest for them. With the approval of the Minister, arrangements can be made with such associations under the provisions of the Housing Act, 1936, as amended by the Housing Act, 1949, (1) to provide any housing A. which the authority could provide; (2) to alter, enlarge, repair, or improve houses or buildings; (3) to provide dwellings by means of conversion

of houses or other buildings. Arrangements may include terms as to types of houses, rents, and other matters considered expedient by the authority. Exchequer contributions in respect of this housing provision are considered in HOUSING FINANCE (q.v.).

The Minister may recognise any central association or other body estab. to promote the work of housing associations. (The Minister has recognised for this purpose The National Federation of Housing Societies, 12 Suffolk Street, London, SW.1.) Housing associations are incorporated under the provisions of the Industrial and Provident Societies Acts. They are given tax concessions and other advantages. For instance, the Housing Repairs and Rents Act, 1954, Section 33, removes houses of such associations, like those of local authorities, from the control of the Rents Acts.

BUILDING SOCIETIES. Under the Housing Act, 1949, a local authority may, in accordance with proposals approved by the Minister, guarantee the repayment of advances made by building societies to members for the purpose of building or acquiring houses. Where the guarantee extends only to the amount by which the loan exceeds the normal society advance, and the liability of the local authority cannot be greater than two-thirds of that excess, the ministry may undertake reimbursement to the authority of not more than one-half of any loss sustained. In other words, under the scheme any loss is borne in equal shares by the building society, the local authority, and the ministry. The properties to which this facility is applicable must not exceed £5000 in market value.

REQUISITIONED HOUSES. To meet the emergency in the provision of houses arising from the Second World War, the powers of the Minister under the Defence (General) Regulations, 1939, to requisition property were used extensively for housing purposes. The power was delegated during the war by circular to clerks of local authorities, and the delegation continued until 1948. A process of de-requisitioning has since been pursued, but substantial units of A. are still held and managed by local authorities as agents for the Minister.

The Requisitioned Houses and Housing (Amendment) Act, 1955, repealed the power to requisition premises for general housing purposes. Possession of houses already requisitioned is transferred from the Minister to the local authorities, who may continue so to use them until 31 March 1960, but no longer. Meanwhile premises must be released: (a) when falling vacant, unless the Minister authorises retention; (b) when the owner accepts the licensee (existing occupier) as his statutory tenant; (c) on order of the co. court for occupation by the owner or his family; (d) on direction of the Minister in case of hardship unless the local authority purchase; (e) when the owner undertakes modernisation or conversion into flats with a rent-restricted tenancy to persons nominated by the local authority.

Expenditure in respect of requisitioned premises is transferred to the local authority, who will be assisted by grants from the Exchequer. The local authorities must have divested themselves of requisitioned premises by 1960, either by release, as previously described, or by purchase or lease of the premises.

See also HOUSING; HOUSING ACT, 1936; HOUSING FINANCE; OVERCROWDING, ABATEMENT OF; TOWN AND COUNTRY PLANNING.

Accommodation Bill, bill of exchange to which a party has put his name without consideration (q.v.), and for the accommodation of another; the latter should find the funds for payment when the bill becomes due, but the holder for value (*see* BILL OF EXCHANGE) is entitled to sue the accommodating party, though he knows of the want of consideration. The fact that an acceptor is an 'accommodation party,' though no defence to an action by another party, entitles the acceptor to what he would not usually have, a recourse to the drawer he accommodated. The defence of an 'accommodation bill' or 'accommodation party,' therefore, is very rarely one which gets beyond the solicitor or counsel when they are first consulted, because it is seldom any use to bring such a defence into court.

Accommodation of Scripture, application of Scripture to a subject with which it has no strict connection in the mind of the human or of the divine author. It is a favourite device of preachers, and is quite legitimate, provided it is remembered that the meaning given to the passage in an accommodated sense is not the genuine use of Scripture, and no proof of a doctrine can be drawn from it. A. of S. is often found in the Liturgy of the Church, in the choice of a lecture to suit a particular occasion (*see Catholic Commentary on Holy Scripture*, 1953).

Accompaniment, in music, is the assistance given to a solo part by subordinate parts either vocal or instrumental. Thus a song or a violin solo may have a pianoforte A. to support the solo with harmony and texture. A. is also the harmony of a figured bass.

Accomplice, person associated with another in committing or attempting to commit a crime. An A. may give evidence in court, i.e. turn queen's evidence, but, although there is no exact rule to this effect, the general practice is to discount its value unless supported by independent testimony.

Accoramboni, Vittoria (d. 1585), Duchess of Bracciano, famous for her beauty and tragic hist. Married to Francesco Peretti, nephew of Pope Sixtus V, she instigated his murder, then married his murderer, the Duke of Bracciano. On his death she was involved in a lawsuit with Luigi Orsini regarding the inheritance, and was murdered by him at Padua.

Accord and Satisfaction may be pleaded by a defendant in a civil action in an Eng. court, viz. that he has agreed with the plaintiff, and has acted upon the agreement, to pay money or perform

some action in satisfaction of the plaintiff's demand.

Accordion, musical instrument invented by Damian of Vienna, 1829. It is in the form of a small oblong box, consisting of a row of very small elastic metallic springs, fixed at one end in a plate of metal, so that they may vibrate freely, and a bellows to put the springs into vibration. The instruments vary in size and in capabilities, and 2 or more notes can be played at once.

Accorso, Francesco (Latinised *Accursius*) (c. 1180-c. 1260), lt. jurist, b. Florence. He wrote glosses on Rom. law, and his chief work, the *Great Gloss*, was long a standard authority.

Accorso, Mariangelo (c. 1490-c. 1550), lt. writer and critic, b. Aquila. A great favourite of Charles V, he pub. in 1524 the *Diatribae in Ausonium, Solinum, et Ovidium*.

Accoucheur, see MIDWIFERY.

Account, general term for a statement of pecuniary transactions between two parties. According to Eng. law, an *A. stated* is one in which both debtor and creditor have agreed to the balance. The debtor is not, however, precluded from showing, if he can, the existence of error, but if the *A.* has been actually settled by payment it can only be re-opened upon proof of fraud. A *settled A.* is a written statement, agreed to by both parties as correct, of the final position of 2 *A.s.*

All modern commerce is conducted by keeping records of *A.s* (see BOOK-KEEPING), and public bodies and companies, such as tn councils, limited liability companies, friendly societies, executors and trustees, or administrators of estates and similar officers of the court, are all bound by statute to keep *A.s.*, and provision is made for audit and inspection. It is also a criminal offence under the bankruptcy laws for the bankrupt to have failed to keep such books as the usage or importance of his business would seem to warrant.

Account, or **Accompt**, Writ of, form of legal action now rarely resorted to, but which was much used in early times, for the recovery of money wrongfully retained.

Account Current, **Account Sales**, see BOOK-KEEPING.

Accountant, person skilled in the practice of keeping books of accounts and generally with a knowledge of bankruptcy and mercantile law. The name is applied to officials, such as are employed by banks, insurance companies, railways, and other large businesses, whose duty it is to supervise the keeping of accounts and to prepare balance sheets, etc. An *A. of Court* is an officer of the Scottish court of session, whose duties are defined by the Judicial Factors (Scotland) Act, 1889, part of which include bankruptcy affairs. The profession of accountancy is generally more of a consultative nature, and an *A.* one who is called in from outside to audit and investigate books, to give advice as to how they should be kept, and to make

reports as to solvency. Their status has been regularised and their standard of efficiency maintained by societies of *A.s.*, some incorporated under royal charter, and a member of one of these societies is called a *Chartered A.* The Institute of Chartered *A.s* in England and Wales (q.v.) was founded in 1880 and the Society of Incorporated *A.s* (q.v.) in 1885. In the U.S.A. there is an Association of Public *A.s.*

Accountant-General, title applied today to a civil servant, usually the head of an accounts branch in certain gov. depts, such as the Ministry of Supply, Commonwealth Relations Office. *Accountant and Comptroller General* is the title of the head of the accounts dept in Inland Revenue, and also in Customs and Excise.

Accra, seaport in and cap. of Ghana, formerly the Gold Coast. It has all the public buildings usually associated with gov. administration as well as modern shops, schools, and hospitals; 5 m. N. is Achimota College, the chief educational estab. in Ghana. Cocoa is the chief export, and the prosperity of *A.* is largely dependent on the crop and its world price. Other exports are gold, palm oil, and timber. It is the terminus of a railway to Kumasi. *A.* is lighted by electricity and has pipe-borne water supplies. Wireless communications are maintained with other parts of the country. Considerable damage was done by an earthquake which occurred not long before the Second World War. Pop. 135,926.

Accrington, manufacturing tn and municipal bor. in Lancs, England, about 22 m. N. of Manchester. It is noted for cotton manuf., calico-printing, textile machinery, weaving, and brickmaking; it possesses a tn hall and mrkt hall. Coal is worked in the neighbourhood. Pop. 41,000.

Accum, Friedrich (1769-1838), Ger. chemist, b. Bückeburg, Lower Saxony, crossed to England in 1793, and became prof. of chem. in London in 1802. He introduced illumination by gas into England by his *Practical Treatise of Gas-light*, 1815. He was appointed prof. in Berlin in 1822, and d. in that city. His other chief works are *An Essay on Chemical Reagents*, 1816, and *A Treatise on the Adulteration of Food*, 1820.

Accumulation (Capitalism), see CAPITAL. **Accumulation**, legal term implying the *A.* of income from an estate that has been bequeathed by will or deed, during such time as the legatee might not enjoy the estate. Thellusson's Act, 1800 (40 Geo. III, c. 98), which imposed certain restrictions on *A.*, provided that it could only continue during the life of the settler plus 21 years, or during the period of legal minority of the legatee. Where *A.* has been directed contrary to the provisions of this Act, the direction as to *A.* is null and void, but not the settlement, and the property passes to such person or persons as would have been entitled to it had *A.* not been directed. Certain exceptions, such as the provision for payment of debts and for raising portions for children, etc., are made in Section 2

of the Act. The Act at first applied only to England, but it was extended to Scotland in 1848 (12 Vict. c. 36).

Accumulation of Power, see ACCUMULATOR, HYDRAULIC.

Accumulator, Electric, or storage cell, an electrolytic cell in which a current passed through ('charging') effects chemical change in the 'active material,' involving increase in chemical energy, recoverable as electric energy when the electrode plates are connected through an external circuit ('discharge'), the chemical reaction being then reversed. The cell usually

forming lead sulphate, the electrolyte becoming more dilute. During charge the water in the electrolyte is decomposed; the sulphate on the negative is reduced to spongy lead, with formation of sulphuric acid; and the sulphate on the positive is ultimately converted to lead peroxide. The electrolyte recovers its concentration and sp. gr. The plates in the Faure cell consist of grids or frames of antimony-lead alloy with 'pockets' and pores filled with the active paste. In the Planté cell the active material is formed on the plate surface itself, which is



LABADI BEACH, NEAR ACCRA

E.N.A.

consists of a number of interleaved, alternately positive and negative plates, one more negative than positive, so that every plate except the two outer negative ones is used on both faces. This prevents the buckling of positive plates on excessive discharge current. The plates are kept apart by porous separators of wood or plastics and are immersed in electrolyte. All the positive plates are connected together to one terminal, likewise the negative. The container is a rectangular box of glass, wood, or plastics. In the Planté lead-acid cell the electrolyte is dilute sulphuric acid; the active material is lead peroxide on the positive, and spongy lead on the negative, plate. The spongy material is 'formed' by repeated charging and discharging. The Faure cell differs from the Planté in having red lead as active material on the positive and litharge on the negative. During discharge the acid attacks both plates,

made with ribs and pores to increase the area. The lead A. gives a voltage of 2.2 V. when fully charged. This voltage depends on the active material alone. If higher voltage is required, more cells are connected in series, forming a battery. The current that can be obtained from a cell depends on the active area of the plates in contact with the acid. If more current is required than can be obtained from one cell, sev. cells are connected in parallel. Batteries are usually charged on about 2.7 V. per cell, and charging is continued until each cell reaches the specified voltage and the electrolyte the normal sp. gr. (1.2-1.3), these values being maintained when the charging is discontinued. Tests are made with a portable voltmeter and a hydrometer. An indication that the charge is nearly completed is given by the 'gassing,' i.e. escape of excess hydrogen and oxygen resulting from decomposition of the water.

The electrolyte should always cover rather more than the surface of the plates. Lowering of the level is due to evaporation of the water, not the acid, and batteries should occasionally be 'topped up' by careful addition of distilled water. The normal sp. gr. of the electrolyte is 1.2-1.3. It sinks on discharge, but should not be allowed to fall below 1.12 before recharging. The capacity of a battery is stated by the makers in ampere-hours (a.h.) at a given rate of discharge, usually 10 hrs. If a battery is stated to have a capacity of 120 a.h. at a 10-hr rate, it can safely be run on a 12-amp. load continuously for 10 hrs, but if discharged at a higher rate, say 24 amp., it will become discharged in less than 5 hrs. Usually the capacity at double rate is only 75 per cent of that at normal rate. On intermittent load the capacity is somewhat higher. The voltage decreases during discharge, but should never be allowed to fall below 1.8 V.

In alkaline A.s the active material is nickel hydroxide on the positive plate and either cadmium and iron oxides (Jurgner, Ni-Fe) or a mixture of powdered iron, ferrous oxide, and yellow mercury oxide (Edison) on the negative plate. The electrolyte is potassium hydroxide. The voltage on charging may be 1.7 V., but when charging ceases it soon drops to 1.3 V. It should never be allowed to fall below 1 V. The alkaline A. is more robust than the lead A., but it is larger and heavier. The above remarks on charge and maintenance apply also to alkaline A.s.

The widest use of lead A.s is in car batteries. Actually the major portion of the world's production of lead is used for A. plates. Batteries are also widely used in connection with series traction motors for delivery vans with a daily range of 20-50 m., and in trolley buses for manœuvring on depot premises. They are essential for supply to emergency lighting in power stations, factories, workshops, theatres, and cinemas, and for signalling on railways and in power stations, in aircraft and in ships. Their use in radio installations is well known. They are also much used in small, private power stations (q.v.) in connection with a Diesel generator set.

Accumulator, Hydraulic. Lord Armstrong's A. consists of a large cylinder in which a piston works through hemp or leather packing. The piston is driven up by the pressure of water forced in at the bottom of the cylinder by successive strokes from a small engine. When the top of the cylinder is reached a catch operates which automatically stops the engine. The piston is usually weighted so as to provide a pressure of about 700 lb. to the sq. in. The energy accumulated may be used to work cranes, dock gates, or any machinery where intermittent power only is required. There are varieties of the machine where pistons of different diameters are employed to give differences in pressure, and others where steam pressure is accumulated.

Steam accumulators are used on boilers

where the demand for steam is variable. Steam from the boiler is blown into a large cylinder when the demand is low. When load increases a reduction in pressure in the A. releases the steam.

Accursius, see ACORSO, FRANCESCO.

Aceldama (H.V. Akeldama), Aramaic for 'field of blood,' name used for the field bought by Judas (Acts i. 18), or by the chief priests, 'to bury strangers in' (Matt. xxvii. 6). It is also called 'the potter's field' (Matt. xxvii. 7, 10). By tradition this field is situated S. of the lower part of the Vale of Hinnom.

Acephali (Gk *akephalos*, headless), name given to sev. religious bodies who rebelled against their bishops and other heads of the Church. It was particularly applied to the Egyptian Monophysites, who declared themselves free from the authority of Peter Mongus, patriarch of Alexandria, in 482.

Acephalous (Gk, 'headless'), term in prosody applied to a line in which, by the normal scansion of the poem, the first syllable is wanting; an example is the second line of:

A red-cross knight for ever kneel'd
To a lady in his shield.

Acer, genus of trees, mostly deciduous, of over 100 species, chiefly native to China and Japan, though *A. campestre* is native to Britain and Europe; *A. macrophyllum*, *A. pennsylvanicum*, *A. rubrum*, *A. saccharum*, *A. saccharinum*, are timber trees of N. America; *A. pseudoplatanus* is the sycamore of Europe; and *A. palmatum* the parent species of ornamental Jap. maples used in the garden. *A. negundo*, N. America, is the box elder. See MAPLE.

Aceraceae, family of shrubs and trees which has for its distinguishing characteristics regular polygamous or dioecious flowers; 5 to 12 stamens; 2 ovules in each carpel. The fruit is double, and has 2 winged samaras; the seed is exalbuminous. The two genera, *Acer* and *Dipteronia*, are found in the N. of Asia, Europe, and America.

Acerbi, Giuseppe (1773 - 1846), It. traveller and naturalist, b. near Mantua. He journeyed through Lapland to Cupe North in 1799, and pub. in England in 1802, an account of his travels under the title *Travels through Sweden, Finland, and Lapland*. He founded a journal, the *Biblioteca Italiana*, at Milan in 1816. Later, as the Austrian consul-general to Egypt, he collected antique objects which he gave to It. and Austrian museums.

Acerenza (anc. *Acherontia*), It. tn in Basilicata (q.v.), in the Bradano valley, 13 m. N.E. of Potenza (q.v.). Together with Matera (q.v.) it forms an archbishopric. The cathedral is built in the Norman style. Pop. 5000.

Acerra (anc. *Aceræ*), It. tn, in Campania (q.v.), 7 m. N.E. of Naples (q.v.). It was once a Rom. tn, and was burnt by Hannibal (q.v.). The cathedral was rebuilt after an earthquake in 1788. There are sulphur springs. Pop. 24,600.

Acestes, mythical king of Sicily, son of the river-god Crimissus by Egesta (or Segesta); a Trojan woman who had been

sent by her father to Sicily to escape the monsters which infested the land of Troy. A. founded the tn of Segesta, and welcomed Aeneas on his arrival in Sicily.

Acetabulum (Lat., 'chalice'), cup-shaped socket in the innominate bone into which the head of the femur fits.

Acetaldehyde, see ALDEHYDE.

Acetamide ($\text{CH}_3\text{CO}\cdot\text{NH}_2$), solid, crystalline compound produced by distilling ammonium acetate in a stream of dry ammonia. As usually prepared it has a strong odour suggestive of mice, but this is due to impurities. It is soluble in water and alcohol, melts at 82° , and boils at 222°C .

Acetic Acid (CH_3COOH), earliest known acid, formed when wines and beer turn sour through exposure to the air. The change is brought about by the agency of bacteria (*Mycoderma aceti*). The bacteria find their way into the liquid from the atmosphere, are nourished by the food contained in the wine, rapidly multiply, and by means of an enzyme they contain cause the oxygen of the atmosphere to react with the alcohol, forming A. A. The sour liquid, or impure acid, is known as vinegar, and is usually prepared from wine that is otherwise unmarketable.

In the Ger. process the wine is allowed to percolate slowly through beech shavings smeared with a culture of *Mycoderma aceti*, meeting a current of air on its downward path. This is known as the 'quick vinegar' process, and requires only three days or so to go to completion.

Commercial A. A. is obtained by the dry distillation of wood in iron retorts at as low a temp. as possible. The products of the distillation are gases, an aqueous liquid, and tar. The liquid contains A. A. mixed with methyl alcohol, acetone, and other impurities. It is treated with quicklime, which causes the A. A. to be converted into calcium acetate. This solution is then evaporated, the tarry products being skimmed off. The acetate is then distilled with concentrated hydrochloric acid and the A. A. is separated. It is mixed with potassium permanganate to oxidise impurities and distilled once more, after which the product is sufficiently pure for commercial purposes. A. A. is also manufactured by passing a mixture of oxygen and acetaldehyde vapour over heated manganese dioxide or granular quartz.

When quite pure A. A. is a colourless crystalline solid, with a pungent smell, a blistering action on the skin, and a sour taste. A 50 per cent solution of the acid has the same sp. gr. as the anhydrous acid, and addition of water to a certain point causes the sp. gr. to rise, although the acid is denser than water. This circumstance renders it impossible to determine the strength of the substance by the use of the hydrometer.

The salts of A. A. are known as acetates, and some of them are of considerable commercial importance. Basic copper acetate, or *verdigris*, manufactured by leaving sheet copper in contact with vinegar, is used as a pigment. Lead

acetate, commonly known as sugar of lead, is used in the manuf. of the basic carbonate of lead (white lead). Ferric acetate and aluminium acetate are both used as mordants to fix the colours in dyeing and printing calico.

Acetic Ether, or **Ethyl Acetate** ($\text{CH}_3\text{CO}\cdot\text{OC}_2\text{H}_5$), a colourless liquid prepared by adding a mixture of alcohol and acetic acid to a mixture of alcohol and strong sulphuric acid, the whole being heated to 140°C . Ethyl acetate is characterised by a pleasant fruity odour, which has led to its being used for flavouring sweets and wines, and in perfumes, etc. It is also a useful solvent.

Acetone ($\text{CH}_3\text{CO}\cdot\text{CH}_3$), or **Dimethyl Ketone**, colourless mobile liquid produced when isopropyl alcohol loses 2 atoms of hydrogen by oxidation (see CRACKING OF PETROLEUM). It is the simplest member of the fatty ketones. A. occurs in small quantities in normal urine, but in far greater proportion in cases of *diabetes mellitus* and *acetonuria*. It is produced during the dry distillation of wood and other organic bodies, such as sugar and gum. Crude wood spirit consists mainly of acetic acid, methyl alcohol, and A. After the acetic acid has been removed by the action of lime, the methyl alcohol and A. are separated by fractional distillation. A. is also prepared by the dry distillation of calcium acetate, but the modern method of manufacture consists in passing the vapour of acetic acid over heated catalysts, e.g. alumina, thoria, or finely divided copper.

A. is miscible with water, alcohol, and ether in all proportions, and is an excellent solvent for many organic compounds, which renders it useful in the manuf. of cordite. It is also used in the preparation of sulphonal, trional, tetronal (drugs), chloroform, iodoform, and viscose rayon.

Acetophenone ($\text{C}_6\text{H}_5\text{CO}\cdot\text{CH}_3$), **Phenyl Methyl Ketone**, or **Acetylbenzene**, crystalline substance melting at 20° and boiling at 202°C . It is a typical member of the aromatic-aliphatic ketone class of compounds. It is most conveniently prepared by treating benzene with acetyl chloride in the presence of aluminium chloride. It is employed as a soporific under the name of hypnone.

Acetyl, the organic group which would result from the elimination of hydroxyl from acetic acid; it therefore corresponds to the formula CH_3CO . It is not stable in the free state (see RADICAL), but is looked upon as the radical of such compounds as A. chloride ($\text{CH}_3\text{CO}\cdot\text{Cl}$).

Acetylbenzene, see ACETOPHENONE.

Acetylene (C_2H_2), colourless gas of disagreeable odour (when impure), formerly used as an illuminant, but now important as an 'intermediate,' i.e. a compound manufactured as a stage in the manuf. of other compounds. It is also used in the oxyacetylene blowpipe for welding, etc. It can be synthesised from its elements by an electric-arc discharge between carbon poles in an atmosphere of hydrogen, but this synthesis, though very interesting chemically, is of no commercial importance. A. occurs in

small quantities in coal-gas, and is produced during the incomplete combustion of many organic substances, such as coal-gas, methane, ethyl alcohol, etc. The most important method of preparation is by the action of water on calcium carbide (CaC_2).

Calcium carbide is prepared by heating carbon with quicklime in an electric furnace. Under the influence of the high temp. the quicklime is converted into calcium, which combines with the excess of carbon, forming calcium carbide, a white solid when pure. It is difficult to eliminate all the impurities from the substance, and the dangers attending the use of A. were formerly due to the presence of impurities as well as to ignorance of the properties of the gas itself.

The method of preparation of A. from calcium carbide consists simply of bringing it into contact with water. The reaction is somewhat violent and is accompanied by the evolution of a considerable quantity of heat. Many types of generators have been invented in which the two substances are brought gradually into contact, either by allowing water to drip slowly upon the carbide, or by throwing small quantities of carbide into the water.

A. burns with a brilliantly luminous flame equivalent to about 240 candles for 5 cub. ft. of gas consumed. The quality of the light approximates to that of sunlight and renders its use advantageous when colour work has to be done by artificial light. It forms with air an explosive mixture which is much more dangerous than a mixture of coal-gas and air. The violence of the explosion is much greater and the limits of explosion much wider, as an explosive mixture is formed by mixing any quantity from 3 to 82 per cent of A., while for coal-gas the limits are from 5 to 28 per cent. Copper combines with A. to form an explosive compound, so that if copper gas fittings are used they must be kept well greased to prevent contact. The flame of A. burning in oxygen reaches a very high temp. (about 3000°C .); the oxy-acetylene blowpipe is therefore extensively employed in engineering and metal-working.

Apart from the use already mentioned, A. finds some application as an anaesthetic (under the name of narylene), and is also the source of valuable non-inflammable solvents such as westrosol (CCl_2CHCl). A number of synthetic rubbers have been developed by Germany since 1927, since the polymers contain butadiene which is synthesised from acetylene. Indeed, acetylene is the starting point for the synthesis of a large number of chemicals, this immense expansion of knowledge playing a fundamental part in Germany's chemical economy during the last war.

Achaea, anct dist. of the Peloponnesus, extending from the R. Larissus along the coast of the Corinthian Gulf to Sicyonia. It is a narrow strip of land bounded on the S. by the Arcadian Mts, and watered

by numerous small streams, many of which are dry in summer. The coast is low and has few good ports. It was originally called Aegialos, afterwards Ionia, sometimes Aegialeian Ionia, and was subsequently occupied by the Achaei, consisting of 12 cities or states. After the Rom. conquest of Greece Achaea comprised all Peloponnesus, with N. Greece, S. of Thessaly.

Achaeian Confederation, see **ACHAEI**.

Achaei (Achaeans), anct Gk people, of disputed origin. Their name first appears in a Hittite inscription of the 14th cent. bc. Homer uses it to denote the whole Gk race as far N. as Thessaly; but in classical times it was limited to the inhab. of a strip of land on the N. coast of Peloponnesus between the Gulf of Corinth and the mts of Arcadia. Twelve cities (Pellene, Aegira, Aegae, Bura, Helice, Aegium, Rhypae, Patrae, Pharae, Olenus, Dyme, and Tritaea) formed a league for mutual protection; but the Achaeian League played only a small part in affairs until c. 251 bc, when Aratus united to it his native tn, Sicyon. Corinth, Megaris, Epidaurus, Troezen, and Sparta also joined, and the league became the chief political power in Greece. It was, however, destroyed by the Romans, who under L. Mummius defeated Diaeus, the Achaeian general, and burned Corinth (then the chief tn of the league) to the ground, 146 bc. S. Greece then became the Rom. prov. of Achaea.

Achaemenes founded c. 700 bc a small kingdom at Parsumash, in the foothills of the Bakhtiari Mts to the E. of Shushtar, under Elamite overlordship. His son and successor, Teispes (675-640), enlarged the kingdom, which was divided on his death between his two sons, one of whom, Cyrus, is regarded as the first of the Achaemenid emperors of Persia.

Achaemenid Art, see **PERSIAN ART**.

Achaemenids, or **Achaemenidae**, name of the dynasty of Persian kings founded by Cyrus, grandson of Achaemenes.

Achard, Franz Karl (1754-1821), Ger. author of Fr. origin, wrote works on experimental physics, chem., and agric.; was the first to manuf. sugar from beet-root; and became director of the physical class at the Academy of Sciences, Berlin.

Achates accompanied Aeneas after the siege of Troy. In Virgil's *Aeneid* he is called *Fidus Achates*, a term often used for any faithful companion. A. is also the name of a riv. in Sicily.

Achelous, or **Aspropotamos**, largest riv. in Greece, rises in the Pindus Mts and flows S. into the Ionian Sea, its length being from 120 to 140 m. It cuts through deep gorges to a swampy delta, off which lie the Echinades Is., mentioned by Homer, Herodotus, and Thucydides. The god of this riv., the son of Oceanus and Tethys and the eldest of 3000 brothers, fought against Hercules for Deianira, was conquered, took the form of a bull, but was again conquered, Hercules taking one of his horns, which, however, he recovered by giving up the horn of Amalthaea. The Naiads changed the horn taken by Hercules into the horn

of plenty (Ovid, *Melam.* ix. 87). A. was considered to be a great divinity throughout Greece.

Achenbach, Andreas (1815-1910), Ger. painter and etcher, b. Kassel. He studied at Düsseldorf, and under Schadow, becoming one of the most remarkable representatives of the school formed by that master. His work consisted almost entirely of landscape paintings—views of Holland, especially of the canals, the North Sea, the Alps, Norway, Italy, and the Rhine. The titles of some of them are 'Hardanger Fjord,' 1843; 'Pontine Marshes,' 1846; and 'Fish Market at Ostend,' 1866.

Achenbach, Oswald (1827-1905), brother of Andreas A., was also a landscape painter, his works consisting almost entirely of lt. scenes. Most of his pictures are in the Ger. museums, but the Luxembourg acquired his 'Pier of Naples.'

Achensee, Austrian lake, the largest and most beautiful in the Tirol. 25 m. NE. of Innsbruck, it is 6 m. long.

Acheron, name of sev. rvs.: 1. Trib. of the Alpheus in Elis.

2. Riv. in Thesprotia, Epirus, flowing through Lake Acherusia into the Ionian Sea (Livy, viii. 24).

3. Riv. in Brutii, S. Italy, on which Alexander of Epirus perished (Livy, viii. 24).

4. Riv. in the lower world, round which the shades hover (Virgil's *Aeneid*, vi).

Acherontia, see ACERENZA.

Acherusia, Gk and Rom. name for many lakes, marshes, and caverns supposed to be connected with the lower world. The Acherusian Marsh where Acheron rose is in Epirus; the Lago di Fusaro into which Acheron was said to flow is in Campania.

Acherusia Palus, see FUSARO, LAKE OF.

Achery, Jean Luc d' (1609-85), Fr. Benedictine monk, b. at St Quentin. His chief work is a collection of documents concerning eccles. history entitled *Spicilegium*, 1653-77. Also collaborated with Mabillon in the *Acta Sanctorum* of the Benedictines, pub. 1733-8.

Acheson, Dean Gooderham (1893-), Amer. lawyer and politician, educ. at Harvard and Yale Univs. After being a successful lawyer he was assistant secretary in the State Department in Roosevelt's administration; under secretary, 1945-7, and secretary of state, 1949-53. As such he was in office throughout the critical period of the Korean War, when his moderate policy made him the target of violent Republican criticism.

Achi Baba, hill in Gallipoli, 709 ft high, 6 m. from Cape Helles. In the Gallipoli campaign (1915) it marked the limit of the Brit. advance. On its slopes Turkish forces numbering 200,000 men, protected by masses of artillery and machine guns, in an elaborate trench system, easily withstood repeated attacks by the Brit. 29th and the Anzac divs.

Achiet-le-Grand, Fr. vil. and railway junction, in Somme dept, which, in the First World War, was taken by Gen. Byng's army in 1917; recaptured by the Germans in the Somme battle of 1918,

and finally retaken by Gen. Byng on 21 Aug. 1918.

Achievement, see HERALDRY, Supporters.

Achill Island, co. Mayo, Rep. of I., the largest is. off the Irish coast, comprising over 36,000 ac. It is mountainous and heather-covered. The prin. vills. are Achill Sound, Dooagh, Dugort, which has seal caves under the cliffs of Slievemore (2204 ft) and Keel. Keem Bay lies below Croaghnaun (2192 ft). Shark-fishing is an industry.

Achillas, minister of the young Egyptian king, Ptolemy XII, with Lucius Septimius murdered Pompey and supported the king against Cleopatra. A. led the army against Caesar, until he was put to death by Cleopatra's younger sister Arsinoë, 47 BC.

Achillea (from Achilles, who received knowledge of the properties of plants from Chiron), a genus of perennial herbs of the Compositae. *A. millefolium*, common milfoil, or yarrow, is native to Britain. *A. pharnacia*, sneezewort, and *A. siberica* are good border flowers.

Achilles, hero of Homer's *Iliad*, son of Peleus, king of the Myrmidones in Phthiotis, Thessaly, and of the Nereid,



ACHILLES

Alinari

Greek sculpture in the Louvre, Paris.

Thetis. Educ. by Phoenix in eloquence and the art of war, and by Chiron, the centaur, in the healing art, he was the bravest of the Greeks, leading his troops of Myrmidones, Hellenes, and Achaeans in 50 ships against Troy. His quarrel with

Agamemnon about the beautiful Briseis caused him to sulk away from the war. Patroclus, however, persuaded A. to allow him to fight with A.'s men and armour, and when Patroclus was slain by Hector A. returned to the war. He then killed Hector, whose body he gave up to Priam, Hector's father, after dragging it thrice round Patroclus's tomb. (The *Iliad* closes with the burial of Hector.) A. was killed in the battle at the Scaean gate before the capture of Troy.

Achilles Tatius (3rd cent AD), Gk writer of Alexandria. His *Romance of Leucippe and Clitophon* influenced the growth of the novel in Europe. There is a text and trans. by S. Gaselee in the Loeb Library (1917). See E. H. Haight, *Essays on the Greek Romances*, 1943.

Achilles' Tendon, see **TENDON**.

Achilleum, tn on the promontory of Sigeum in the Troad, which was said to contain the tomb of Achilles.

Achillini, Alessandro (1463-1512), surgeon and philosopher, b. and d. at Bologna, was one of the first to dissect the human body. His chief works are *Corporis humani anatomia*, Venice, 1516, and *Anatomicae annotationes*, Bologna, 1520.

Achillini, Giovanni Filoteo (1466-1538), It. poet, brother of Alessandro, b. Bologna, where in 1511 he founded the Academy of Viridario. Among his works are *Il Viridario*, 1513; *Il Fedele*, 1523; *Annotazioni della lingua volgare*, 1536.

Achimenes (from Gk *a*, without; *cheimōn*, winter), tropical Amer. genus of plants, family Gesneriaceae, much cultivated for their flowers. A. *grandiflora* and its varieties are most esteemed for green-houses. They grow by means of their rhizomes, the leaves are variegated, and the flowers are variously coloured.

Achin, or **Atejh**, region in the NW. of the is. of Sumatra, with an area of about 21,300 sq. m. The is. has a backbone of mt. ranges from which numerous small rivs. descend to the coast on either side. The inhab. of A. are distinct from the other inhab. of the is., and hold themselves aloof. They have an admixture of Arab and Hindu blood. In their religion they are Muslims and retain the Muslim robe and turban. They are more industrious and intelligent than the neighbouring peoples, but they are very treacherous and unreliable. The social organisation of the Achinese is communal. The ter. was rich in gold and attracted merchants from the 16th cent., but the Achinese persistently opposed the estab. of commercial relationship with European countries. Much fighting precluded the Dutch estab. in A. in the year 1875. Pop. 1,000,000.

Achish, Philistine king of Gath who sheltered David from Saul, and was put to death by the latter (1 Sam. xxi).

Achitophel, or **Ahitophel**, native of Giloh in Judaea, and a counsellor of King David. He assisted Absalom in his rebellion (2 Sam. xv, xvi), and hanged himself when Absalom preferred the advice of Hushai (2 Sam. xvii).

Achondroplasia, congenital condition

in which bone formation within the cartilage does not occur in the normal manner. A. results in stunted growth of the long bones and of the bones of the base of the skull. A. is an inherited defect.

Achromatism, condition of a lens or combination of lenses in which chromatic aberration is almost absent; that is, where the object as seen through the lens has no coloured border. See **ABERRATION** and **LENS**.

Achromatopsia (Gk *a*, without; *khroma*, colour; *opsis*, sight), see **COLOUR-BLINDNESS**.

Acid, in chemistry, a substance capable of splitting off protons (q.v.), or which yields hydrogen ions when dissolved in water; or alternatively (but less comprehensively) a substance containing hydrogen which can be replaced by metals with the formation of salts. The earliest A. known to man was vinegar or dilute acetic A., whence the notion of acidity (*acidus*, acid) was bound up with that substance (*acetus*, vinegar). Nitric A. and sulphuric A. were known to the alchemists of the Middle Ages as being capable of dissolving substances otherwise insoluble. In 1668 Tachenius observed that all A.s could combine with alkalis to form salts. Boyle was therefore enabled to assert the following properties of A.s: (1) they act as solvents; (2) they precipitate sulphur and other bodies from their solution in alkalis; (3) they turn blue vegetable colouring matter red, which can be turned blue again by addition of an alkali; (4) they react with alkalis to form neutral salts. Lavoisier divided all substances into A.s, bases, and salts, the chemical characteristic of A.s being that they were produced by oxygenation. It was pointed out by Berthollet that prussic A. and hydrogen sulphide acted as A.s but did not contain oxygen, and Davy in 1808-10, by investigating the nature of hydrochloric A., helped to overthrow the oxygen theory, which gave place to a dualistic conception by which A.s were divided into two classes, oxyacids and hydracids, their salts being known as amphot salts and haloid salts. Later Berzelius enunciated his electro-chemical theory that in chemical combination there is neutralisation of opposing electricities. Every compound is thus divided into 2 parts, 1 positive and 1 negative. Sodium sulphate, for instance, was looked upon as soda and sulphuric A., each of those being again divisible into 2 parts. The effects of electrolysis, however, did not confirm this theory. In 1838 Liebig investigated organic A.s, and as a result propounded the theory that A.s were simply compounds of hydrogen, the replacing of which produced salts. Further, some A.s contained more than 1 atom of replaceable hydrogen, so that the formation of different salts of the same metal was explained. A.s containing 1 replaceable atom of hydrogen are known as monobasic; those containing 2, dibasic; those containing 3, tribasic; and so on.

The great majority of organic A.s are characterised by the presence of a

carboxyl group, $\text{CO}\cdot\text{OH}$, and their basicity is determined by the number of carboxyl groups. The prin. groups of organic A.s are the aliphatic and aromatic A.s. The aliphatic A.s may be looked upon as derivatives of the paraffins, the alcohols, and the aldehydes; the aromatic A.s are derivatives of benzene. Organic A.s yield metallic salts with bases, and esters (formerly known as ethereal salts) with alcohols.

Some A.s are used in medicine in a dilute form; when strong many of them are powerful poisons. They enter largely into manufs. For the properties and uses of particular A.s the separate headings may be consulted.

The chief inorganic A.s are: boracic, carbonic, chromic, hydrochloric, hydrobromic, hydriodic, nitric, nitrous, phosphoric, phosphorous, sulphuric, sulphurous, and hydrogen sulphide.

Organic A.s: acetic, benzoic, citric, formic, gallic, lactic, malic, oxalic, palmitic, salicylic, stearic, tartaric.

Among organic A.s not containing a carboxyl group may be noted hydrocyanic (prussic) A. (HCN), cyanic A. ($\text{HO}\cdot\text{CN}$), thiocyanic A. ($\text{HS}\cdot\text{CN}$), picric A. ($\text{C}_6\text{H}_2(\text{NO}_2)_3\text{OH}$), and uric A. ($\text{C}_5\text{H}_4\text{N}_4\text{O}_3$).

The strengths of A.s are compared by measuring their hydrogen-ion concentrations at equivalent dilutions.

The acidity of a liquid is often represented in terms of the symbol pH , which stands for $-\log. (\text{H}^+)$, where (H^+) is the hydrogen-ion concentration in gramme-equivalents per litre. A knowledge of the pH of liquids is often very important in medicine, agriculture, biology, food analysis, etc.

Acid-amides, amides compounds which may be regarded as being derived from ammonia by the substitution of the acid or acyl groups for atoms of hydrogen. They are called primary, secondary, tertiary, etc., according to the number of atoms of hydrogen displaced. The chief are *acetamide* and *formamide* (qq.v.).

Acid Carbonate, see **BICARBONATE**.

Acid Rocks, igneous rocks containing more than 65 per cent of silica (SiO_2). The plutonic acid rock granite and types closely associated with it are among the most important components of the continental masses. Volcanic A. R. such as rhyolite, though less abundant, are widespread. See **IGNEOUS ROCKS** and **GRANITE**.

Acidalius, Valens (1567-96), commentator and Lat. poet, b. Wittstock, Brandenburg, wrote excellent commentaries on Velleius Paterculus, Tacitus, and other classical authors.

Acipenser, see **STURGEON**.

Acireale, coastal tn and bathing resort in Sicily (q.v.), on the E. coast, 8 m. NE. of Catania (q.v.). It is at the SE. foot of Mt. Etna (q.v.), and has a fine 17th-18th-cent. cathedral, which sustained some damage during the Second World War. There is a trade in wine, citrus fruits, silk, and sulphur, and there are hot mineral springs. Pop. 39,200.

Acis, Sicilian shepherd, son of Faunus and the nymph Symaethis, who was killed

with a rock by Polyphemus, the Cyclops, his rival for Galatea. Neptune changed him into a stream at her prayer. See **Ovid**, *Metam.* xiii. 750-968.

Ackermann, Louise Victorine Choquet (1813-90), Fr. poetess of strength and originality, but of pessimistic philosophy. Her chief works are *Contes en vers*, 1855; *Contes et poésies*, 1863; *Poésies philosophiques*, 1874; *Pensées d'une solitaire*, 1883. See **Anatole France**, *La Vie littéraire*, 1892.

Aekworth, see **PONTEFRACT**.

Acland, Sir Henry Wentworth Dyke (1815-1900), physician. He was Radcliffe librarian, Oxford, for over forty years, during which time he encouraged the study of natural sciences and medicine. Pub. in 1856 a memoir on cholera at Oxford, 1854; also pub. works on health; collaborated with John Ruskin in *The Oxford Museum*, 1859.

Aclinic (Gk *a*, without; *klinein*, to bend) **Line**, known also as the magnetic equator, is an imaginary line passing round the earth where there is no dip (q.v.) of the magnetic needle.

Acne, common, usually chronic, inflammatory disease of the sebaceous glands (q.v.), associated with seborrhoea (see **SKIN**), and occurring mostly about the face, chest, and back. It is related to endocrine development. The lesions may be papular (consisting of hard pimples) or pustular (containing matter). The disease occurs usually between the ages of puberty and 24 years, is usually worse in winter, and is associated with menstrual and gastro-intestinal troubles. The individual lesions consist of pink, pointed pimples in the centre of which there is a black-topped comedo, or blackhead. Occasionally a parasite, *Demodex folliculorum*, is found in each comedo. Treatment consists in steaming the face and then expelling the blackhead by the use of a small tube. Gentle friction is helpful, and irritation should be allayed by the application of cold cream.

A. rosacea is a distinct disease from the above. It is marked by redness of the nose accompanied by the formation of pimples. Although often thought to be due to alcoholism, it may occur in quite abstemious persons. It is apt to occur in conditions in which flushing is marked, hence it is often associated with the menopause in women.

Acemetæ (Gk *a*, without; *koimasthai*, to sleep), order of Gk monks founded about the middle of the 5th cent. who divided among themselves their service in such a manner that it was continuous and unceasing. A Rom. named Studius founded their famous monastery at Constantinople in 471. Pope John II excommunicated them in 533 for denying the suffering in the flesh, and consequently the incarnation, of the 2nd Person of the Holy Trinity.

Acolhuas, Acolhuans, or Acolhuas, tribe of central Mexico which is said to have founded the settlement of Tezcoco. They were a peaceable people, second in greatness only to the Aztecs.

Acolytes (Gk *akolouthēin*, to follow),

assistants to bishops and priests, who minister in the Christian sanctuary, lighting candles, serving mass, carrying lights, etc. Originally they formed a minor order.

Aeoncagua: 1. Prov. in Chile, S. America, the cap. of which is San Felipe. It is very mountainous in the E., and its fertile valleys, including that of the Aeoncagua riv., have subtropical vegetation. It is rich in mineral resources. The N.-S. line is very important to Chilean communications. Area about 3940 sq. m.; pop. 113,550.

2. Mt. peak of the Andes, on the frontier of Mendoza, Argentina, and Chile. It is an extinct volcano 22,835 ft high, and is probably the highest peak in S. America. First climbed in 1897. See E. A. FitzGerald, *The Highest Andes*, 1899. Ojos del Salado, lying between Chilean Atacama and Argentine Catamarca provs., is claimed to reach 23,292 ft.

Aconcio, Giacomo (Lat. *Jacobus Aconcius*) (c. 1500-c. 1566). It. theologian, b. Trent and d. London. He became a convert to Protestantism, and dedicated his *Stratagemata Salanae*, 1565, to Queen Elizabeth I.

Aconite, Winter, *Eranthis hyemalis*, species of the Ranunculaceae common in England. The solitary yellow flowers appear in Feb.-Mar. before the leaves.

Aconitin, vegetable alkaloid found in aconite which is one of the most powerful poisons known. It is inodorous, intensely bitter, and produces a tingling sensation, which causes it to be useful when applied externally in the treatment of neuralgia, gout, and rheumatism. As a poison it causes death by asphyxiation.



ACONITUM (MONKSHOOD)

Aconitum, Monkshood, or Wolf's-bane, genus of plants belonging to the Ranunculaceae, all species of which are poisonous. They are hardy, herbaceous plants, many of them of great beauty, and may be recognised by the galeate or helmet-shaped posterior sepal. *A. napellus*, the monkshood, a common

Brit. flower, whose blue helmet-shaped flowers appear in summer, is one of the most deadly species; *A. ferox*, the *bikh* or *bish* of Nepal, contains the fatal bikh poison in its root. In England *A.* is often called wolf's-bane, and in France *tue-loup*, or kill-wolf.

Aconitum, Properties of. As plants of this genus are of a poisonous character and contain the alkaloid *aconitin*, great care must be taken to use only *A. napellus* in medicine. The leaves, when chewed, produce a tingling sensation, but the root causes numbness as well as tingling. It diminishes the rate of the pulse and the heart-beats when taken internally, but leaves the brain unaffected. For internal use it is in the form of tincture or extract, and is employed as a sedative to the stomach, and as a relief in fevers and nervous diseases; for external use it is formed into ointments or liniments, and relieves neuralgia. In cases of aconite poisoning the stomach must be immediately emptied, until when no stimulants should be given; artificial respiration and application of hot-water bottles to the extremities will also probably be necessary.

Aconitius, beautiful youth of the is. of Ceos. To win the love of Cydippe, daughter of a noble Athenian, he threw before her, in the temple of Diana, an apple, on which he had written the vow: 'I swear by the sanctuary of Diana to marry A.' Cydippe picked it up, read it aloud, and threw it away; but the goddess had heard her, and when Cydippe was about to marry another she fell so ill that her father married her to A. (Ovid, *Heroides*, 20, 21).

Aconitius, Jacobus, see ACONCIO, GIACOMO.

Acorn, fruit of the *Quercus*, or oak (q.v.). It is a nut, being a large, dry fruit, which does not break open to free the seed, and its base is enclosed in a cupule. The A. cups of *Q. aegilops*, known as valonia, are used for tanning.

Acorn-shells, popular name of the crustacean *Balanus*, of the order Cirripedia and family Balanidae. The testa is white and consists of 6 pieces; the animals exist in all seas and are attached to rocks, shells, and floating bodies.

Acorus, genus of plants of the Araceae which has 2 species. *A. calamus*, the sweet flag, and *A. gramineus*, a Jap. flower. The sympodial rhizome has a sweet-scented oil, and by its branching reproduces the plant vegetatively.

Acosta, Gabriel, or Uriel d' (1585-1640). Portuguese, b. Oporto of noble birth. He was brought up as a Catholic, but adopted the Jewish faith and went to Amsterdam, where he opposed the Jewish teaching. For his *Examen dos tradiçoes phariseas*, 1624, he was charged with atheism, punished, and excommunicated. He shot himself in 1640. He is often regarded as a precursor of Spinoza.

Acosta, Joaquín (1799-1852), S. Amer. traveller, explored the valleys of the Andes and Socorro to the Magdalena in 1834, and studied Indian tribes in 1841.

Chief work, *Compendio histórico del descubrimiento y colonización de la Nueva Granada en el siglo XVI*, 1848.

Acosta, José de (1539-1600), Sp. writer, b. Medina. He was a Jesuit, and became prof. of theology at Ocaña. From 1571 to 1588 he lived in S. America as a missionary; during that time he wrote a hist. of that continent, pub. at Seville in 1590 under the title of *Historia natural y moral de las Indias*. An Eng. trans. of this work by E. Grimston was pub. in 1604. A. became a great favourite with Philip II and held various dignities. See L. Lopetegui, *El padre José de Acosta y las misiones*, 1942.

Acouchi, popular name of the *Dasyprocta acouchi*, found in Guiana and the Is. of St Lucia and Granada. It differs from the other agoutis (q.v.) in possessing a tail of about 2 in. in length instead of a mere tubercule.

Acoustics, term formerly applied to that branch of physics which deals with phenomena associated with sound waves. In recent years, however, there is a tendency to restrict its use to those properties which make a room or hall suitable or otherwise for hearing music and oratory. Sound waves are movements in the air which proceed in all directions from the source. The quality of the sound as heard by the audience is affected by reflection from the surfaces of objects in the building. The bad A. of a building are due to surfaces and apertures having dimensions which are large compared with the wave-length of the sound. In a large, bare hall, for example, there is considerable reflection from the roof and walls, so that the sounds heard are mingled with the echoes of those gone before. If the hall is large and has no peculiarities of structure, these echoes may be dissipated into negligible small waves by breaking up the surfaces with drapery, and by the floor being well occupied with chairs and people. All auditors of a concert ought to be in view of the performers to get the right effect, because if the sound waves have to flow round obstacles the small waves are cut off so that the quality of the music is changed. Everyone has experienced the change in the effect of the music when a band comes round the corner. At first one hears the drums and heavy instruments; the lighter clarinets, piccolo, etc., contributing their proper effect only when the band comes in full view.

One way to improve the A. of a large hall is to coffer the ceiling and walls and to render the coffers or sunk panels absorbent. As a complete determination of the possible echoes and focusing effects in an auditorium presents a complicated problem, it is in most cases sufficient to study sections through the building, and there are sev. methods of studying the reflecting characteristics of sections. Thus the necessity for imitating buildings of good design has disappeared with the modern practice of calculation from drawings, combined with tests on a model with the aid of ripple-tank and sound-camera.

A common method of locating echoes is by means of the 'echo-spotter,' a device for projecting a parallel pencil of sound waves of high frequency.

The problem of constructing a building with good A. is somewhat difficult to solve, because the building must be erected before its qualities in that respect can be demonstrated with certainty. Sensitive flames may be used to distinguish the effect of large obstacles and apertures, but experiment in these matters has led to no very satisfactory results. The whispering gallery, which is such an interesting feature of some churches, illustrates the effect of echoes; a whisper at one focus of an ellipsoidal roof is reflected at all points in the roof, bringing all reflections to a focus at one point, with the result that the whisper appears magnified many times. Consult W. C. Sabine, *Collected Papers on Acoustics*, 1927; A. H. Davis and G. W. C. Kaye, *The Acoustics of Buildings*, 1927; Sir James Jeans, *Science and Music*, 1937; H. Bagenal, *Practical Acoustics and Planning against Noise*, 1942.

Acquapendente, It. tn in Lazio (q.v.), on the Paglia, 22 m. NW. of Viterbo (q.v.). It is built on a precipitous mass of rock, 1400 ft above sea level, and has a fine cathedral. There was some damage during the Second World War. Girolamo Fabricius (q.v.) was b. here. Pop. 7000.

Acquaviva Delle Fonti, It. tn in Apulia (q.v.), lying at the foot of the Apennines, 16 m. S. of Bari (q.v.). Pop. (com.) 12,300.

Aquai (Rom. *Aquae Statiellae*), It. spa, in Piedmont (q.v.), on the Bormida, known since Rom. times for its hot sulphur springs. It has a medieval castle and a Gothic cathedral (partly 11th cent.). Napoleon defeated the Austrians here in 1796. Pop. (tn) 16,100; (com.) 18,200.

Aquisti, Luigi (1744-1824), It. sculptor, b. Forlì. The scenes of his labours were Bologna, Rome, and Milan, and his masterpiece is a group of 'Venus and Mars.'

Acquittal (from O.F. *aquiler*, to free or discharge), the setting free by a court of a person charged with a crime. In an Eng. court there must first be a verdict of 'Not guilty,' in a Scottish court of 'Not guilty' or 'Not proven.' A. by a jury must, however, be confirmed by the judge. If after an A. the person is again charged with the same offence, and if he can prove that he has been formerly acquitted (or pardoned), he is entitled to be discharged.

Acrolein, see **ACHOLEIN**.

Acre, or Acco (called **Ptolemais** during the sovereignty of the Greeks in Syria), tn on the coast of Israel, built on a small promontory which, with Mt Carmel to the S., forms a circular bay. It was taken by the crusaders, 1104; retaken by Saladin, 1187; taken by the crusaders under Philip Augustus of France and Richard I of England, 1191, and given to the Knights of St John; fell into the hands of the Egyptians, 1291; taken by the Turks, 1617; besieged by Bonaparte for 61 days, 1799, but saved

from assault by Jezzar Pasha and Sir Sidney Smith; taken by Ibrahim Pasha, 1832; taken by the English, Austrians, and Turks, 1840, Ibrahim Pasha returning to Egypt. Afterwards it was restored to the Turks. It was captured by Brit. forces under Gen. Allenby in 1918. Although awarded to the Arabs by the United Nations, it was captured by the Jews on 17 May 1948, and became part of Israel. A. is one of the most picturesque places in Palestine. The walls and earthworks—a perfect example of the late 18th-cent. fortress—are almost intact. From the direction of Haifa a good view is obtained of the S. battlements, the ruins of the 'Tower of Flies,' and the remains of the Phoenician breakwater. The tn itself is entered by an archway in which stand the original iron-plated gates. Within the gate is the 'White Market,' with its curious vaulted roof, and the general markets and bazaars extend along towards the harbour. Among its *khans* the most notable is the Khan Shahwarda, which contains old cannon of the time of Sir Sidney Smith. Of its 6 mosques, that built by Jezzar Pasha at the close of the 18th cent. is the most graceful, with its colonnaded courtyard. Under the citadel, which was either built or reconstructed by Abdallah Pasha in 1820, and under the girls' school opposite, are the crypts of the residence of the Knights of St John. In an adjoining part of the citadel is a small museum containing Phoenician glass and treasures uncarthed in the castle of Montfort. About half a m. to the E. of the walls is Tel ul Fukhar, where Richard I pitched his tent in 1190; and from this place, too, Napoleon directed operations in 1799. Pop. 17,000.

Acre = 4840 sq. yds = 160 sq. poles = 10 sq. chains. This is the statutory A. Historically it is the Eng. A. as distinct from the obsolete Scottish and Irish A.s of 6150.4 and 7840 sq. yds respectively. These magnitudes present an intriguing geometric aspect which can be illustrated by saying that an Eng. circular A. will fit in a Scottish square A.; a Scottish circular A. in the Irish square A.; and this Irish A. as a circle has a diameter of 100 yds, which is that of the outer earthwork circle at Stonehenge. See A. E. Berriman, *Historical Metrology*, 1953. See also METROLOGY.

Acre Territory, W. Brazil, on the borders of Peru and Bolivia. Famous rubber dist. Ceded by Bolivia, after negotiations led by Baron Rio Branco, in 1903. Area 59,139 sq. m.; pop. 115,000.

Acri, lt. tn, in Calabria (q.v.), 16 m. NNE. of Cosenza (q.v.). Pop. 16,000.

Acridine, $C_{12}H_8N_2$, organic compound found in crude coal-tar anthracene and used in the manuf. of dye-stuffs. It is crystalline, melting at 108° C.

Acisius, son of Abas, King of Argos, and father of Danaë (q.v.). See also PERSEUS.

Acrobat (derived from a Gk word meaning, literally, to walk on tiptoe), name applied to all those performers who exercise their skill in difficult physical feats. A.s can be divided into:

Acrobats pure and simple, who are essentially gymnasts and do amazing twists and turns with their bodies, walk on their hands, or perform on ropes or various kinds of apparatus, the more seemingly unsuited to the performance the better. These include tumblers, who specialise in falling from seemingly impossible heights into seemingly impossible positions and who never seem to hurt themselves. Tumbling also forms part of the art of a true clown—as typified by Charlie Chaplin. The appeal of seeing another human being fall over and get



Hulton Picture Library
THE TOVARICH TROUPE

into danger of severe injury is universal. Oriental A.s and tumblers are unequalled. They are adepts at forming human pyramids, mounting on each other's shoulders, limbs, and heads, and all supported by the central figure of the strong man—or 'underman.' Equilibrists, who balance themselves on tops of poles or on each other's hands and feet, are also A.s.

Trapeze artists, who are not A.s in the strict sense of the word but are more truly gymnasts, form the most sensational part of any circus or entertainment in which they perform. On their trapezes high above the ground and over the heads of the audience they perform the most sensational feats of daring and skill. Often a slip would be fatal. They can perform solo, in pairs, or in almost any number, and there are male and female trapeze artists of equal skill. As they swing in the air one leaves go, turning in

mid air, and is caught by the other with perfection of timing and physical effort. The skill of the 'catcher' is equal to that of the 'flier.' Hanging by his knees upside-down, swinging to and fro, he must so time himself that he catches the hands of his partner who hurls himself or herself at top speed from the other swinging trapeze, often doing somersaults *en route*. The catcher must not fail—it might easily mean death. Although the art of trapeze artists is old, the first to create a real sensation in this country was Leotard, who became known as 'The Daring Young Man on the Flying Trapeze.' He came to the Alhambra, Leicester Square, London, in the 1860's when that place was part music-hall and part circus, and electrified all beholders by his skill. Despite the daring of his tricks he never had an accident, but he *d.* young, at the age of 28. Victor Julien was another famous trapeze artist, but was outshone by Niblo, who did a double somersault in mid air between trapezes; he was surpassed by 'Lulu,' who did a treble somersault. Despite name and appearance 'Lulu' was a young man named Farini. The quadruple somersault is regarded as the blue riband of the trapeze act. There are trapeze artists of immense skill to-day, and the thrill they provide never palls.

Wire walkers; tightrope walkers. Walking the wire is an extremely specialised acrobatic feat. An early performer in this country was Hengler, who founded the circus family of that name, and who was a famous rope-walker (for tightrope walker and wire walker mean the same thing, the wire having eventually supplanted the rope used in earlier days). Walking the rope or the wire was—and is—performed by both men and women. Madame Saqui was an early female rope walker. She performed at night, in the open air with fireworks going off all round her. The greatest performer of all time was Blondin (q.v.), and many now living saw his astounding feats of balance. He walked across the Niagara Falls on the tightrope—a feat also performed by Harvey, a Canadian tightrope performer. Tightrope or high wire walking is not so prevalent to-day as it once was, but recently some incredible feats on the wire were performed by a Russian troupe which visited London with the Russian Circus—a circus with a wonderful tradition. The slack wire was much lower than the high wire or tightrope, and it was not stretched tensely but sagged in the middle. This was used more often on the music-halls than in circuses, although it was common to both and required just as much skill. Performers like Jolly Johnny Jones could do back somersaults on the slack wire and maintain their balance when swaying from side to side at immense speed. The tightrope or high wire exponent usually carried a long weighted pole to maintain equilibrium, and the slack wire performer used either a paper parasol or nothing at all.

Trampoline acts are a never-failing source of delight in circus or in variety. It is a form of acrobatic and balancing

art. The trampoline consists of a large sheet of canvas fixed to an apparatus which looks like the body of a bedstead. Beneath the canvas are powerful springs. The trampoline artist bounces high in the air, in ever-ascending height, falls on his face or back, rebounds on to his feet with apparent ease, and does all sorts of acrobatic tricks whilst bouncing like a ball. It all seems too easy until the inexperienced person tries it and discovers it to



Hulton Picture Library

KARL CARSONY, BALANCING ON ONE FINGER ON A BOTTLE, A TRICK WHICH TOOK HIM 5 YEARS TO PERFECT

be a miracle of mental and physical timing.

Kisley acts consist of balancing, mostly by the feet. The main performer lies on his back on a wooden frame, extends his legs in the air, and juggles with barrels, balls, and all sorts of objects, controlling them only with his feet. He does the same with human partners, throwing them round and round, up in the air, but never missing.

There are many other types of act, such as pole balancers, and ladder acts where a man or woman will ascend a ladder and balance thereon with no other support, performing tricks as he does so. Trick cyclists also perform—one, an

Amer. named Eddie Gifford, used to dive from the roof of the London Hippodrome into a tank of water on a bicycle, and he had only one arm. Another named Diavolo looped the loop on a bicycle round a wooden hoop of wide dimensions of which the arc in mid air, at the top of the loop, was missing entirely.

There are also A.s who stand on balls, and by strength of foot force them up steep inclines and circular ramps surrounding towers and down again. See CIRCUS.

Acroceraunia, promontory in Epirus, Greece, on the coast of the Ionian Sea, ending in Cape Glossa. Because of indentations and the deposit of silt the coast has always been dangerous to shipping.

(q.v.) is sometimes associated with A. When the growth in the anterior pituitary body is extreme pressure may interfere with the function of the optic nerves (the optic chiasma), leading to disturbances of vision and sometimes blindness. There is no certain treatment for A., but irradiation of the pituitary body has been tried.

Acromion (Gk *akros*, extreme; *ōmos*, shoulder), apophysis which in man constitutes the termination of the spine of the scapula, or shoulder-blade; it articulates with the extremity of the clavicle, or collar-bone, and gives attachment to the trapezoid and deltoid muscles. See SHOULDER.

Acropolis (from Gk *akros*, high; *polis*, city), fortified hill, rock, or elevation of ancient Greece. Among these strongholds



THE ACROPOLIS, ATHENS

Acro-Corinthus (Gk *akron*, a peak), steep rock, 1886 ft high, which is near the city of Corinth, in Greece. It contains the ruins of the Acropolis, ancient fortifications, a temple of Aphrodite, and the famous well, Pirene.

Acrodus (from Gk *akros*, at the top; *odus*, tooth), fossil fish found in the Triassic system.

Acrogaster (from Gk *akros*, at the top; *gaster*, belly), genus of fossil fish of the Berycidae, found in the Cretaceous system.

Acrolein, or **Acraldehyde** ($\text{CH}_2 = \text{CH} \cdot \text{CHO}$), colourless liquid formed during the partial combustion of fats. The disagreeable smell produced when a tallow candle is extinguished is due to the formation of A. It is an unsaturated aldehyde, boils at 52° , has an irritating action on the skin, and its vapours cause a copious flow of tears.

Acrolepis, genus of fossil fish found in the Permian system.

Acromegaly (Gk *akros*, extreme; *megas*, great), rare disease occurring in adults and due to an overgrowth of the cells of the anterior part of the pituitary body (q.v.) which causes increased production of the growth hormone (see HORMONES). In A. there is overgrowth of the distal parts of the limbs, the chin, the ears, and usually of the heart. *Diabetes mellitus*

were the A. of Corinth, called Acro-Corinthus (q.v.); that of Larissa at Argos; of Mt Ithome at Messene; of Thebes, called Cadmea; but the chief was the A. of Athens. This (called also Cecropia) is a rock about 150 ft high, 1150 ft long, and 500 ft broad, which in early times was partially surrounded by the Pelasgian wall. Here the first kings of Athens built their palace, and a temple of Athena, the Hecatompelon, existed before the Persian invasion. Later edifices were the Parthenon, the Propylaea, designed by Mnesicles 437 bc, a temple of Nike Apteros, the Erechtheum, the sanctuary of Artemis Brauronia, and the Pinacotheca. Many of the sculptures from the A. were brought to London by Lord Elgin in 1816. See M. L. D'Ooge, *Acropolis of Athens*, 1908; H. Payne and G. M. Young, *Archaic Marble Sculpture from the Acropolis*, 1936.

Acroscopic, formerly **acrostich** (from Gk *akros*, a tip, extremity; *stichos*, a line or row), verse or set of verses whose initial letters form a word, a phrase, or even a sentence. In the *Spectator* Addison notes compound A.s in which the end letters have formed the same word as the initial ones, and sometimes the same letters have run like a seam through the middle of the verse; these are known as single, double, or triple A.s. It has even been found possible to form a pentacrostic, in

which the same name occurs 5 times in so many columns. (Telestich, from Gk *telos*, end, is an analogous composition in which the final letters of the lines are employed.) This poetical conceit is of ancient date. Bishop Eusebius (d. 340) giving in his *Life of Constantine* a set of Gk verses, said to have been composed by the Erythraean sibyl, of which the initial letters formed the words *Iesous Christos Theou Uios Soter* (Jesus Christ, the son of God, the Saviour). These initials in turn form *ichthus*, a fish, which thus came to have a mystical meaning. Each div. of Psalm cxix contains 8 verses, each set of 8 beginning with the same letter, *aleph, beth*, etc. Several early Heb. poems are extant in which consecutive lines or verses begin with the successive letters of the alphabet; they are, we may say, Abecedarian poems. The comedies of Plautus are each preceded by an argument, the initial letters of which, when joined, read as the title of the play, and the Fr. poets from Francis I to Louis XIV partook of this literary trifling. The best-known Eng. A.s are contained in Sir John Davies's *Hymnes of Astraea*, 1599, in praise of the queen, consisting of 26 poems, each of 16 lines whose first letters form the words *Elisabetha Regina*.

Acrotatus (d. 264 bc), son of Areus, succeeded to the throne of Sparta in 265 bc. Before his accession he fought with success against Pyrrhus, King of Epirus, at the siege of Sparta, 272 bc; in the year following his accession he was killed in battle against Aristodemus, tyrant of Megalopolis.

Acroterion (from Gk *akrotērion*, extremity), in architecture, a pedestal placed on the apex or a lower angle of a pediment, and supporting a statue, vase, or other ornament.

Act, in drama, that portion of a play which is divided from other portions by an interval, or *entr'acte*. In the Gk drama there was no such div. of plays, for if the prin. actors were not on the stage the chorus was, but the Rom., like the present-day dramatists, utilised the break in presentation to imply passage of time. Rom. dramatists like Plautus and Terence always wrote their comedies in 5 A.s, as in later times did Shakespeare and some other Elizabethans, but modern writers often content themselves with 4 or 3 exposition, development, and conclusion.

Act of bankruptcy, in law, denotes an A. the commission of which by a debtor renders him liable to be adjudicated bankrupt if a creditor presents a petition against him within 3 months of such A. Such A.s include assignment of his property to trustees for the benefit of his creditors generally; fraudulent transfers of his property; charges on his property by way of fraudulent preference; departing out of the country or leaving his dwelling-house so as to defeat or delay his creditors; filing a declaration of his insolvency or presenting his own petition; notifying any of his creditors that he is about to suspend payment of his debts; or various other acts described in the Bankruptcy Act, 1914.

Act of Congress. A bill or resolution which has been passed by both the Senate and the House of Representatives becomes an A. of C. if accorded the consent of the president. If vetoed by the president and returned for reconsideration, the bill may then become an A. only on being passed a second time by a two-thirds majority in each house. A.s of C. are of two kinds, either public or private, the first being concerned with law and revenue. All resolutions are presented privately by individual members; they may originate in either the Senate or the House of Representatives, except those concerned with revenue, which must be initiated in the latter.

Act of God is the term used in law for any untoward occurrence not arising from human cause or negligence, but from natural causes such as could not reasonably have been expected to be foreseen and guarded against. Damage by storms, lightning, floods, or exceptionally high tides or sharp frosts, etc., may be attributed to the A. of God, and in the absence of any contract to the contrary, no person can be held liable for it. Nearly all insurance forms and shipping charter-parties, and most contracts, have a clause relating to non-liability in the case of an A. of God.

Act of Grace. An A. of the Scottish Parliament which compelled creditors to provide food for their imprisoned debtors who were without means of support. It was amended in the reign of George IV, and since the abolition of imprisonment for debt (1880) it has necessarily lapsed.

Act of Parliament, a law made by the joint action of the 3 estates of the realm—the lords spiritual, the lords temporal, and the Commons; in other words, by the king in parliament. The draft copy of a proposed A. is called a 'bill,' and a bill only becomes an A. when it has received the royal assent. This may be given either by the sovereign in person or by lords commissioners. A bill may be introduced into either House of Parliament with the exception of what are known as money bills, which the House of Lords may neither initiate nor amend. This practice is based upon the resolutions of the Commons of 1671 and 1678, and until the rejection by the Upper House of the famous Lloyd-George budget of 1909 it was generally assumed that the rejection of a money bill was a breach of the privileges of the Commons. The Parliament Act of 1911 definitely laid down this principle by statute, leaving to the Speaker of the House of Commons the decision as to what constituted a money bill, and in the case of other bills provided for joint sittings of both houses in case of dispute and for the final passage of a bill into law without the assent of the Upper House if for 3 successive sessions (since reduced to 2) it had obtained a majority in the Commons. No bill can be introduced more than once in a session, and it has sometimes been necessary to prorogue parliament in order that a bill which has been rejected may be reintroduced without delay. A bill

may be either private or public. A public bill may be introduced by any member of parliament, but nowadays only gov. bills have much chance of passing into law. Public bills are debated in principle on the first, second, and third readings, and in detail in committee or on report. A private bill, i.e. a bill in the interest of some individual or corporation, is introduced by the petition of the parties concerned, and passes through the same stages. If, however, the preamble of a private bill is not 'proved,' i.e. if the special committee to which it is referred after its second reading finds that there is no *prima facie* cause for it, it is thrown out. All A.s are public unless otherwise stated, they are binding on all, and do not need to be publicly promulgated, every citizen being presumed to know what is in them. The public A.s of the U.K. do not apply to the Crown, the Isle of Man, or the Channel Is. An A. may be temporary, and many temporary A.s (100 or so) are renewed from year to year by the Expiring Laws Continuance Act. An A. remains in force in England until repealed, but in Scotland A.s that have never been repealed are sometimes held to have lost their force owing to lapse of time. In citing an A. the name is given of the sovereign in whose reign it was passed, the year of his reign, and the chapter, i.e. the number of the A. among the other A.s of the same session. Thus 6 Geo. IV c. 62 would be cited for the A. passed in the sixth year of King George IV to amend the A. of Grace (*supra*).

Act of Sederunt. An ordinance or enactment made by the judges of the Scottish supreme court, the Court of Session, mainly directed to the end of regulating procedure in the courts and expediting the administration of justice. This power was conferred on the judges by King James V in 1532, and at one time had wide scope, approaching legislative power; but no such authority is now claimed by Scottish judges. A quorum of 9 judges is necessary to pass an A. of Sederunt. Similar enactments for regulating criminal procedure are passed by the High Court of Justiciary, and are known as A.s of Adjournal.

Act of Settlement, an A. passed by a Tory Gov. in 1701 in the reign of William III, which had for its object 'the further limitation of the Crown, and better securing the rights and liberties of the subject.' It was of great importance in settling the modern constitution of the country and arose out of the need for securing the Protestant succession to the throne. King William and his consort, Mary, were childless, as was also Anne, the heir-presumptive, the elder branch of the Stuarts were dead or Rom. Catholics; so the succession was settled on the Electress Sophia of Hanover, a granddaughter of James I, and her heirs, 'being Protestants.' In order to give effect to the A., an A. was passed in 1705 to naturalise the lineal descendants of the Electress Sophia. Thus her son, George I, was a Brit. subject. These two A.s were invoked in 1956 when the House of Lords

declared Prince Ernest Augustus, a lineal descendant of the Electress Sophia, to be a Brit. subject. In addition to arranging for the succession by a series of 8 important articles, the A. of S. restricted the power of the throne and guarded against abuses. The 2 most important articles were those relating to the appointment of judges (making them practically irremovable), and asserting the right of parliament alone to declare war.

Act of Supremacy, an A. of 1559, providing that the sovereign should be the supreme head of the realm in all spiritual matters. This confirmed the A. of 1534, repealed in Queen Mary's reign (1554).

Act of Toleration, an A. passed in the first year of William III (1689), and confirmed by 10 Anne c. 2, by which religious freedom (denied by the A. of Uniformity and the Five Mile Act, etc.) was granted to all dissenters from the Estab. Church except Catholics and Unitarians. In effect it repealed the Conventicle Act of 1664, but it did little more.

Act of Uniformity, an A. passed in 1662, in the reign of King Charles II, requiring all ministers to declare their unqualified assent to the Prayer Book. For failing to do so about 2000 were deprived of their livings.

Act of Union. Although the kingdoms of Scotland and England came under one crown when in 1603 James VI of Scotland became James I of England, and although Ireland had come effectively under Eng. dominance about the same time, it was not until 1707 that the Scots, and 1801 that the Irish, parliaments were merged with the Eng. by the 2 A.s of Union. The earlier A. provided that 16 elected peers and 45 members of the House of Commons (now 74) should represent Scotland at Westminster, and the latter A. secured for Ireland a representation in the Brit. parliament of 32 peers and 100 members. The Irish representation was subsequently increased to 103; but, from the creation of the Irish Free State, only N. Ireland was represented, namely by 13 members.

Acta Diurna ('Transactions of the Day') was the title of an official jour. pub. each day from 59 bc in republican and imperial Rome. It was the nearest approach in ant. times to the modern newspaper, for in addition to official announcements it contained the results of chariot-races, notices of births, marriages, and deaths, etc.

Acta Eruditorum, pub. at Leipzig from 1682 to 1782, a scientific and literary monthly printed in Lat. The first editor, Otto Mencke, was a prof. of the univ., and his son and grandson succeeded him in the editorial chair. Among its many able contributors was Leibnitz (q.v.), who first announced in it his method of differential calculus.

Acta Sanctorum (Acts of the Saints), series of vols. still uncompleted, recording the lives of the saints and martyrs of the Church. Suggested by a Flem. Jesuit, Hierbert Rosweyde, in 1607, the first vols.

were pub. in 1643 by John Bolland (q.v.). Other Jesuits who aided or continued the work were named Bollandists after their leader. Over 65 vols. have already appeared.

Acta Senatus, official record of the proceedings of the Rom. Senate. Though discontinued under the empire, they were preserved and remained accessible to historians, e.g. Tacitus.

Actaea (from Gk *akta*, the elder-tree, from a similarity to its leaves), genus of herbaceous perennials, family Ranunculaceae, which are found in America, Europe, and the N. of Asia. *A. spicata*, the baneberry or herb Christopher, well known in England, has a poisonous purplish-black fruit.

Actaeon, son of Aristaeus and Autonoe, daughter of Cadmus, was a famous huntsman trained by Chiron. He surprised Artemis bathing with her nymphs, was changed into a stag, and devoured by his own pack of hounds. Euripides makes him anger the goddess by boasting that he excelled her in hunting (*Bacchae* 330). See also Ovid, *Metam.* iii. 131, 232.

Acting, see THEATRE.

Actinism (from Gk *aktis*, a ray), term formerly used to express the property supposed to belong to certain rays of light—chiefly solar and lunar—by which chemical changes are produced as in photography.

Actinium (Ac), metal separated out from pitchblende by Debierne. It is radioactive—that is, it emits energy by virtue of its chemical identity, not of any physical relationship to anything else. Its atomic weight is about 230, and its atomic number is 89. See RADIOACTIVITY.

Actinolite, see AMPHIBOLE.

Actinometer, instrument invented by Sir John Herschel in 1825 to measure the amount of heat received from the sun upon a given surface in a given time. It consists of a thermometer with a large bulb, filled with a dark blue fluid, which is enclosed in a box. The sides of the box are blackened and the apparatus is covered with a thick plate of glass. Readings are taken in sun and shade, which by subtraction give the amount of expansion due to direct sunlight. The term A. or actinograph is now applied to many types of instrument used by photographers to estimate the actinic power of sunlight on any given occasion.

Actinomyces, small genus of soil-frequenting fungi, some species being injurious to root crops, such as *A. scabies*, responsible for potato scab.

Actinomyositis (Gk *aktis*, ray; *mykēs*, fungus), infectious, inoculable, parasitic disease, commonly known as 'lumpy jaw' or 'big jaw', first observed in cattle, and also sometimes occurring in man, characterised by chronic inflammation, and often resulting in tumours about the jaws.

Bollinger in 1877 gave a description of the ray-fungus (*Actinomyces bovis*) to which he had discovered the disease in cattle was due. One year later Israel of Berlin discovered the same disease in man. Infection normally takes place through the

mouth, teeth, and pharynx, the microbe generally being introduced with food. From an examination of 32 cases Boettroem concluded that the organism enters in association with certain cereals, chiefly barley; and it is noteworthy that those infected have generally been concerned in occupations dealing with cereals.

Most cases of A. have occurred in connection with the oral cavity. The patient complains of toothache and of difficulty in opening the jaw. A swelling appears at the angle of the jaw, which passes into suppuration, pus being discharged externally and into the mouth. From this the disease may spread downwards into any organ. Pulmonary A. is characterised by a cough and foetid expectoration, which on examination reveals the presence of the *Actinomyces*. The organism may also infect the intestines, where it grows upon the mucous membrane, leading to ulceration. Perforation of the serous coat of the bowel may occur, leading to peritonitis.

The diagnosis of the disease rests solely upon the discovery of the *Actinomyces*. The hardness of the borders of the ulcers and of the neighbouring muscles in oral A., and the yellow granules in the pus, are indications, but must not be considered conclusive until the identification of the microbe.

The course of the disease is chronic. Mild cases may recover in from 6 to 9 months, oral A. being the most favourable. Pulmonary A. is usually fatal, death resulting from pyaemia.

The treatment is mainly surgical, the part involved being excised, with a free use of disinfectants. Potassium iodide is used internally, often with success, but penicillin given in large doses over a long period is the most effective treatment.

Actinozoa, in zoology, class of the Coelenterata, animals of a simple type of organisation, distinguished by radial symmetry, hence the name, from Gk *aktis*, ray, and *zōon*, an animal. They are divided into 2 sub-classes, Zoantharia and Aleyonaria, the former including sea anemones, stony corals, and black corals, and the latter the precious red coral, sea fans, and sea pens.

The sea anemone, which may be taken as a typical example, has a broad base by which it attaches itself to a rock, a cylindrical column beset with warts or tubercles, and an upper disk which is encircled by numerous tentacles. In the middle of the disk is the mouth, which leads to a gullet communicating with the stomach cavity, from which other cavities radiate. The animal partly paralyses its prey (small fishes, sea urchins, etc.) by the use of stinging capsules, and ingests it whole. The corals are distinguished by the formation of a calcareous skeleton.

The class is sometimes known as Anthozoa.

Action, Least, Principle of, asserts that, subject to the condition imposed by the equation of energy (q.v.), the manner in which a conservative system passes from one configuration to another is always

such that the A . is a minimum. This principle, due to Maupertius, uses the word A . in the following sense. A particle of mass m and velocity v follows a path S . The A . of the particle over a very small section of the path, dS , is $mdvS$. The A . of the particle over the whole path is obtained by summing all these contributions.

This principle is but one of a number of so-called 'minimal' principles, of central importance in mechanics and optics.

Action and Reaction (Motion, Laws of), see NEWTON and MOMENTUM.

Action at Law. This term is usually applied to proceedings in a *civil* court of law to determine questions submitted by the parties. The person who brings the A . is called the plaintiff and his opponent the defendant (in Scotland they are respectively known as the pursuer and defender). The form of proceedings differs in various courts, and certain A s can only be brought in specific courts, but the main features are substantially the same in the courts of England and Scotland. The defendant is served with a summons directing him to appear in court. The questions which the court will be asked to decide are summarised in the plaintiff's summons and statement of claim; the issues challenged by the defendant are contained in his defence and/or counterclaim. Before the A . is tried certain details, such as the documentary evidence to be adduced, are settled by preliminary proceedings known as interlocutories. For instance, the court decide whether the A . shall be tried by a judge alone or with a jury. In certain A s, e.g. for defamation or breach of promise, either party can claim a jury as of right. In an A . tried by jury, the judge decides questions of law and the amount of any damages to which the plaintiff may be entitled. The decision of the court, in whichever party's favour it may be, is incorporated in an official order or judgment. Although the award of costs is discretionary, the loser of the A . is usually ordered to pay his opponent's costs. If the amount is not agreed by the parties, it is assessed or 'taxed' by a court official called a taxing master.

Theoretically since the Judicature Act, 1873, A s irrespective of their subject-matter may be brought in any div. of the high court. In practice common law A s (e.g. for defamation, negligence, or breach of contract) are heard in the queen's bench div.; A s concerning the validity of wills, the dissolution of marriage, and collisions between ships are the concern of the probate, divorce, and admiralty divs.; and certain matters involving questions of equity (q.v.) (e.g. the execution of trusts) are assigned to the chancery div. Certain A s have to be heard by co. courts (q.v.). Scots law never recognised a formal distinction between law and equity, so that all A s can be brought before the court of session, apart from certain applications which must be made to the inner house.

Scottish A s are also broadly divided as follows: declaratory, to define the nature and extent of the rights of the pursuer; rescissory, to set aside or rescind a fraudulent or erroneous document; petitory, to sue for debt or damages for breach of contract; and possessory, for an injunction restraining from interference with property—in other words, for the maintenance of the *status quo*. An A . upon the case signifies an A . under the common law prior to which particulars of the wrong complained of, or the case, were set down in detail.

As in Eng., so in Amer. practice and procedure, fixed forms of A . have been abolished by the majority of jurisdictions. For these there is now one single form for all causes. This is the outcome of what is called the Field Code of 1848, so called because it was framed principally by the labours of David Dudley Field (q.v.), who was appointed in 1847 to revise practice and procedure in New York state. This code was subsequently adopted by a large number of other jurisdictions, and its simplicity, free from the inherited jargon of legal pedantry or outworn Latin, is pre-eminently in accord with Amer. ideas. This reform also abolished the distinction between common law forms of A . and other forms, and, like Eng. procedure after the Judicature Act of 1873, it enabled equitable and legal remedies to be provided by one and the same court. But there is no actual fusion of law and equity any more than there is in Eng. procedure. For the rest, though Amer. procedure is so largely derived from the Eng., there is considerable difference arising from the fact that the Federal and States courts still follow their several systems of procedure.

Action Française, Fr. political right-wing anti-Semitic group formed in 1898 during the Dreyfus affair (q.v.) to restore the monarchy under the Bourbon-Orléans family, and having as its organ the paper *L'Action française*. Its political leader was Léon Daudet, its sole deputy in the House of Representatives, and its chief publicist Charles Maurras, who advocated prov. autonomy, a corporate state, and a privileged position for the Rom. Catholic Church. After 1940 A . F. supported Pétain's gov., and it was suppressed by de Gaulle's gov. after the liberation in 1944, because of its collaborationist attitude during the Second World War.

Actisanes, anct king of Ethiopia, who conquered Egypt in the reign of Amasis.

Actium, now Akri, tn and promontory at the entrance of the Ambracian Gulf on the W. coast of Greece. It is celebrated as the scene of the final overthrow of Antony and Cleopatra by Augustus, on 2 Sept., 31 BC. Apollo, from his temple on the promontory, received the title of Actius or Actiacus. For a description of the battle see Dion Cassius, Bk I.

Activist, in Soviet Russia a person, whether a member of the Communist party or not, who voluntarily assists the party in its directing and supervisory work in all organised spheres of life.

Acton, John Emerich Edward Dalberg-Acton, 1st Baron (1834-1902), historian, grandson of Sir J. F. E. Acton, B. Naples. He studied under Dr. afterwards Cardinal Wiseman at Oscott, but received his chief teaching from Dr. Dollinger, becoming leader of Eng. 'Liberal Rom. Catholics.' In 1895 he was appointed regius prof. of modern hist. at Cambridge, in which year he pub. his *Lectures on the Study of History*. After his death his great library was presented to Cambridge Univ. On Newman's retirement in 1859 he ed. the *Rambler*; in 1862 the *Home and Foreign Review*. His *History of Freedom in Antiquity* appeared in 1877, and he projected, but did not live to see the accomplishment of, the *Cambridge Modern History*, 1902-10. He was a devoted admirer of Gladstone (by whose influence he was raised to the peerage, 1869), and his *Letters to Mary, Daughter of the Rt Hon. W. E. Gladstone*, were ed. by Herbert W. Paul with an introductory memoir, 1904. A's efforts to secure a reunion of Christians of different communions, and his prolonged opposition to the proposed dogma of papal infallibility, made him unpopular with some of his fellow Catholics; but his own fundamental orthodoxy never faltered, and his religious sincerity influenced many outside his own Church. See *Lord Acton and his Circle*, ed. by Abbot Gasquet, 1908, and D. Mathew, *Acton: the Formative Years*, 1946.

Acton, Sir John Francis Edward (1736-1811), b. Besançon, the son of an Eng. doctor. He entered the Tuscan Navy, and in 1779 reorganised the Neapolitan Navy, becoming Prime Minister, Generalissimo, and Minister of Finance at Naples. In 1791 he succeeded to his cousin's title. In 1798 he fled with the King and Queen of Naples to Palermo on account of the Fr. invasion, but resumed his power on the king's restoration in 1799. In 1806 he again fled with the royal family.

Acton, municipal bor. of Middx., England, lying just W. of London. Still a vil. in the early 19th cent.; its modern development began c. 1860. It was a centre of Puritanism in Cromwell's time. Among its residents have been Richard Baxter, George Savile, Marquess of Halifax ('the Trimmer'), Henry Fielding, and Mrs Barry, the actress. A. returns one member to Parliament. Pop. 67,100. See also BEDFORD PARK.

Acton Burnell, Statute of, passed in 1283 by a parliament which assembled in the par. of this name 8 m. from Shrewsbury. The passing of this statute was indicative of the growing importance of the mercantile class, and its object, as set forth in the preamble, was to make provision for the more speedy recovery of debts. It also removed the staple (q.v.) from Calais to various tns in Britain.

Actor, son of Deion or Myrmidon, and grandfather of Patroclus, whose descendants were called Actorides.

Acts of the Apostles, The, fifth book of the N.T. The A., like the third Gospel to which it refers as 'the first treatise,' are

dedicated to Theophilus (Beloved of God), which may be the real or the assumed name of a Rom. convert, probably an imperial official as he is called 'Excellency.' The Gospel and the A. are identical in style; and early tradition, nowhere contradicted, assigned the authorship of the Gospel to Luke. This is borne out by an examination of the 'we' passages in the A. When 'we' is used it can always be shown that Luke is present, and when the third person, that he is absent. The A. were probably written between AD 63 and 69, for the author records the arrival of St Paul in Rome, but not his death. This is denied by those who place the Gospel later than the fall of Jerusalem in AD 70, for the Gospel certainly preceded A. The A. form the chief source of early Christian hist.: their authenticity has never been seriously questioned. The book was written in Greek and falls into 2 parts, the first 12 chapters dealing with the Church in Jerusalem and Judaea, with St Peter as the central figure, and the second, written often in the first person plural, treating of the Church among the Gentiles and the journeys of St Paul. Archaeology has again and again indicated the careful accuracy of St Luke as an historian, even in details of local colour and administration. 'Nowhere can he be convicted of a mistake. On many points on which he used to be supposed to be in error, he has now been proved correct (E. J. Bicknell, *A New Commentary on Holy Scripture*, 1928). See W. M. Ramsay, *St Paul the Traveller*, 1895; S. J. Caiger, *Archaeology and the N.T.*, 1939; W. L. Knox, *Acts of the Apostles*, 1948. The A. were not quoted often, nor very early. Papias, who was bishop of Hierapolis in Phrygia in the earlier half of the second century, was acquainted with them, as he refers to Philip the Deacon and his daughters (Acts xxi. 9), and Justus Barsabas (Acts i. 23). Irenaeus, Tertullian, Hippolytus, and Clement of Alexandria quote A. frequently; the echoes of them are to be found in the writings of Ignatius, Polycarp, and others.

Actuarius, Johannes (d. 1283), physician at the court of Constantinople. He wrote an important treatise on urinoscopy (diagnosis of disease by examination of the urine) and another on mental disease.

Actuary. The functions of the A. are primarily concerned with the application of the theory of probability, and of mathematical and statistical processes generally, to practical affairs, and especially to the financial and statistical problems connected with life assurance and pension funds. There are statutory requirements that certain of these functions should be performed by a qualified A.

The derivation of the word *actuary*, from the Lat. *actuarius* (the official who recorded the *acta* or deeds of the Rom. Senate), affords no clue to its modern significance. In England, during the 18th cent., de Moivre and other eminent mathematicians were commonly consulted on the valuation of annuities and other interests dependent upon human life.

Modern life assurance may be said to date from the estab. in 1762 of the Equitable Society with its scale of premiums properly graduated according to age. In the society's deed of copartnership, its chief executive officer was styled *Actuary*, and the widespread use of the word *actuary* to describe all those who were skilled in problems involving life and similar contingencies was almost certainly due to the character and abilities of Wm Morgan, F.R.S., the A. of the Equitable from 1775 to 1830, who may justly be regarded as the father of the actuarial profession. The skill in calculation required by the nature of the work of the A. led to a special emphasis on mathematical ability. Thus fellows of the Royal Society played a large part in the development of actuarial science in its early days, and in the 19th cent. fellowship of the Royal Society was accorded to such professional A.s as Benjamin Gompertz, Griffith Davies, Charles Ansell, and Peter Hardy.

In life assurance work A.s are almost invariably employees of the company, the prin. A. occupying a responsible executive position. He is required, among other matters, to fix premiums to and value the liabilities; he may also be concerned with the investment of the funds, the acceptance of risks, and legal and taxation matters affecting life assurance. A.s are also engaged in the supervision of the finances of pension funds, friendly societies, and similar institutions; in this sphere the A. usually acts in the capacity of a consultant. A.s are employed in the Gov. A.'s Dept. an important part of whose work is concerned with the finances of the National Insurance scheme, in the Admiralty, and other gov. depts, as well as by local authorities and public boards. Because of their familiarity with financial and statistical problems, a growing number of A.s are employed in administrative, financial, and statistical work in industry, both private and nationalised, and commerce.

The methods of assembly and analysis of statistical data form an essential part of the training of an A. He is thus basically a statistician who has also received a mathematical training of a practical character designed to fit him to apply the professional techniques developed in connection with the activities mentioned above. In view of their special preoccupation with vital statistics, A.s have always played an active part in the study of the problems of demography.

The professional qualification of an A. is secured in the United Kingdom by passing the examinations of either the Institute of A.s or the Faculty of A.s, bodies which were founded respectively in 1848 in London and 1856 in Edinburgh, and which have since been incorporated by royal charters. The standard of the examinations is high. Both these bodies are concerned not only with the granting of diplomas, but with the professional education and training of actuarial students. In this connection they administer, for the assistance of students, a joint Actuarial Tuition Service, which

provides tuition for the examinations of both bodies. To further the educational side of their activities, the Institute and Faculty have pub. from time to time a complete range of text-books. Both the Institute and Faculty seek to advance the standard of professional knowledge by the discussion at sessional meetings of papers submitted by members. A record of the proceedings at these meetings is preserved in the Jour. of the Institute and the Transactions of the Faculty. The councils of the two bodies collaborate in the conduct of a continuous investigation of the mortality of assured lives and annuitants, based upon data contributed by individual life offices.

The Society of A.s is a sister body operating in Canada and the U.S.A., and granting diplomas of standing similar to those of the Institute and Faculty. There are also actuarial bodies in a number of continental countries. International Congresses of A.s are held from time to time at which papers are submitted and discussed. Arrangements for successive congresses are part of the functions of the Comité Permanent des Congrès Internationaux d'Actuaires, with headquarters in Brussels, membership of which is international.

Acuña, Cristóbal de (1597–c. 1650), Jesuit missionary, b. Burgos and d. Peru. He wrote an account of a journey of exploration down the Amazon, which appeared in 1641 as *Nuevo descubrimiento del gran río de las Amazonas*.

Acupressure (Lat. *acus*, needle; *premere*, to press), method formerly used of compressing an artery with a needle to arrest a haemorrhage. The needle is placed perpendicularly to the artery near its opening, crossing over it in such a way as to exert pressure upon it, and thus stopping the flow of blood.

Acupuncture (Lat. *acus*, needle; *pungere*, to prick), in surgery, puncture of the skin with a needle for the exit of fluid, the relief of pain, etc. It was long used by the Chinese, who believed that by such an operation the harmful vapours which gave rise to certain disorders were released from the body.

Ad Duo Pontes, see PONTEVEDRA.

Ad libitum, or *ad lib.* (at discretion, at pleasure), in music, denotes that the part so marked need not necessarily be played strictly to time, but that the performer may pause or introduce any cadenza or addition of his own. An accompaniment is said to be *ad lib.* when it is not essential, and may be either played or omitted.

Ad valorem (Lat., 'according to the value'), commercial term implying that calculations for stamp duty, etc., are made on the value of a bond or other article. In rules and orders fixing certain duties, *a. v.* duties, as opposed to *specific* duties, are those levied according to the value of the goods imported. *A. v.* stamp duties, e.g. in the case of a lease or a bill of exchange, are, under the Stamp Acts, payable according to the value of the subject-matter of the particular instrument.

Adagio (It. *adagio*, at leisure), in music,

term indicating that the movement is slow. It is also used as the name of a piece of music, or as the distinguishing title of a single movement.

Adair, James (fl. 1775), trader and historian of the Amer. Indians, emigrated to America in 1735. He adopted the theory that the Amer. Indians, among whom he lived for 40 years, came from the lost 10 tribes, a theory subsequently elaborated by Dr Boudinot in his *Star of the West*, 1816. His *History of the American Indians*, dealing with their language, habits, and character, is a valuable and interesting work.

Adalbert (c. 1000-72), Archbishop of Hamburg-Bremen, declined the papacy offered by Henry III and desired to found a patriarchate in the N. He exercised great power over Henry IV, whom he educated, and though the nobles accomplished his expulsion from court in 1066, he was recalled in 1069. He assisted in the conversion of the Wends. See Adam of Bremen's *Gesta Hammaburgensis Ecclesiae Pontificum*.

Adalbert, St. (d. c. 740), b. Northumbria. As a deacon he accompanied St Willibrord (q.v.) to Friesland, and he was the patron of Egmont Abbey.

Adalbert, St., apostle of the Slavs (c. 956-997), b. of a noble Bohemian family, was consecrated Bishop of Prague in 983. He afterwards became a Benedictine monk in Rome, but twice returned to preach in Poland, Prussia, and Hungary. He was martyred near Danzig, and in 1880 his bones were reinterred in Prague Cathedral. St A.'s feast is kept on 23 April.

Adalia, see **ANTALYA**.

Adam, the first man. The word, linked with *adamah*, ground (Gen. ii. 7), and probably connected with the Heb. root *adam*, red, is used as a generic name for man in the Heb. and Assyrian languages. In Gen. the article is sometimes prefixed and sometimes not, giving us 'the man' as the first created individual, and 'man' as a species. *Adam* as a proper name does not really occur until Gen. v. 1. (The word for man in Gen. ii. 23 is *ish*, that for woman being *ishshah*.) Two accounts of the creation of A. are combined in the Bible. Gen. i.-ii. 3 describes it as taking place on the sixth day after that of the plants and animals. The more detailed narrative, starting at ii. 4, tells of the formation of man of the dust of the ground, and his installation in the Garden of Eden, in the midst of which grew the tree of life and the tree of knowledge of good and evil. The fruit of the latter tree was strictly forbidden him, but he was enjoined to cultivate the other plants and enjoy their fruits. The animals were then formed from earth substance, and were named by A. Then God caused a deep sleep to fall upon him, during which Eve was made from his own flesh and bone. Induced by the tempter to eat of the forbidden fruit, Eve persuaded A. to eat also, and for this disobedience both were expelled from paradise to become the progenitors of a fallen race. Much has been written in discussion of the question whether the story of A. was

intended as hist., mythology, or parable, and on its relationship to the findings of modern science. Scientific inquiry like that of Darwin classifies facts to arrive at the 'laws' or uniformities of nature, disregarding questions like creation and the ultimate destiny of man. The Gen. account, on the other hand, attempts to describe the relationship of God and man, stating the hist. of the human race in terms of such facts as were available, with a direct view to formulating a religious code. The aim of the writer being the spiritual elevation of mankind, the story of creation is told chiefly for its spiritual and moral significance. 'It is a popular account suited to the mentality of the writer's age, and directed to a purely religious purpose' (*Catholic Commentary on Holy Scripture*), so that fact and allegory are blended.

Many accounts of the creation from other sources contain elements of the Bible story. Among the anc. Egyptians, for instance, it was believed that men were produced from the mud of the Nile under the influence of the sun-god. Babylonian inscriptions describe a garden with 4 rvs. as being connected with an early state of innocence, and the serpent also features in Babylonian mythology. The prehistoric lore of the Hebrews was of course connected with that of their neighbours. The contrast between the spiritual truth and profundity of the Gen. narratives and the shallowness and gross polytheism of creation myths elsewhere shows the enlightening and refining power of inspiration. By adding together the years in the generations of the patriarchs, as given in Gen. v., Bishop Ussher arrived at the date 4004 bc as the time of A.'s creation. The value of such a method of computation is now understood to be nil; life began many millions of years ago, and man has been differentiated from the other animals probably for at least 100,000 years.

Later Jewish stories introduced fanciful accounts of A., as that he was of huge proportions, covering the earth completely. His first wife was Lilith, who fled from him and became a demon when Eve was created. In the Manichaean mythology, A. is not represented as a creation of God at all, but as the son of Satan, prince of darkness, by 'Sin' or 'Desire.' Satan had stolen light from heaven, which passed into A., and by diligent fostering by the spirits of good the prospect of light's finally overcoming the power of darkness in man was held out as the great hope of the Manichaean religion. Eve was given to A. by Satan, and represents the sensual element. She, however, was seduced by Satan; thus Cain and Abel were said to be the sons of Satan and Eve, the offspring of A. and Eve being Seth, who thus carried forward the tradition of light.

A Mohammedan account states that A. performed a penance lasting 1000 years in Ceylon. Augustine suggested that the cause of A.'s expulsion from Eden was that, after Satan's victory over Eve, A. was led by the power of love to share her shame and punishment. This idea is

adopted in *Paradise Lost*; Milton also used the Rabbinical accounts of the celestial hierarchy, Satan being identified with Lucifer, 'son of the morning,' who had fallen from heaven. Another Rabbinical tradition made A. the author of Psalm xli., the 'Sabbath Psalm.'

An attempt has been made to prove that A. was a so-called Palaeolithic man, to whom the Creator added prenatally the moral and spiritual qualities which differentiated Neolithic man from his immediate forerunners. (See M. Morris, *New Light on Genesis*, 1926, and *Man Created during Descent*, 1926; E. F. Sutcliffe, 'Genesis,' in *A Catholic Commentary on Holy Scripture*, 1953). Pius XII in his encyclical 'Humani Generis,' 1950, says that divinely guided evolution is a theory compatible with revelation so far as the physical organism of man is concerned, but not as concerning his soul; that Gen., however, clearly teaches the unity of the human race, descended from an original pair, so that polygenism (the appearance of truly human creatures—consisting of body and soul)—in different places, independently is not a permissible theory: such a theory cannot be reconciled with what the sources of revelation and the Church's authoritative teaching put forth concerning original sin.

Adam, famous Fr. family of sculptors, comprising Jacob Sigisbert A. (1670-1747), a sculptor of religious subjects and his 3 sons, all natives of Nancy. Lambert Sigisbert (1700-59) went to Paris in 1719, and after 4 years' study gained the *prix de Rome*. At the command of Pope Clement XII he executed a design of the Virgin appearing to St Andrew Corsini, and he became subsequently academicien of St Luke. He was much employed in decorating royal residences, and his works include 'La Seine et la Marne,' at St Cloud; 'Neptune et Amphitrite,' 1740, at Versailles; 'Vénus au bain,' 1742, for the château de Cholsy; and 2 marble groups, 'La Chasse' and 'La Pêche,' now at Potsdam. He pub. in 1754 a *Recueil de sculptures antiques grecques et romaines*. Nicolas Sébastien (1705-78) went to Rome with his brother, and was elected academicien for his 'Prométhée déchiré par un vautour,' 1762, now in the Louvre. Other works are 'Le Martyre de Sainte Victoire,' 1743, and the tomb of Catherine Opalinska, 1749, at Nancy. François Balthazar Gaspard (1710-61) also obtained the *prix de Rome*, and afterwards lived in Berlin as sculptor to the King of Prussia from 1747 to 1750. His works were of mythological subjects, such as 'Apollon,' 1748, and 'Diane au bain,' 1756. All 4 d. in Paris.

Adam, Adolphe (1803-56), Fr. operatic composer who studied composition under Boieldieu and wrote many comic operas. Among his best works are *Le Chalet*, 1834; *Le Postillon de Longjumeau*, 1836; *Le Roi d'Yvetot*, 1842; *Capitostro*, 1844; *Le Tordador*, 1849; and the ballet *Giselle*, 1841. His autobiographical *Souvenirs d'un musicien* and *Derniers souvenirs d'un musicien* were pub. 1857-9. See A. Fougis, *Adolphe Adam*, 1877.

Adam, Albrecht (1786-1862), lithographer and one of the finest painters of Ger. battle scenes, b. Nordlingen. He followed Beauharnais in Russia and Italy, and accompanied Radetzky in 1848. Among his best works are 'The Battle of Moscow' and 'The Battle of Leoben.'

Adam, Alexander (1741-1809), scholar, b. Moray. Educ. at Edinburgh Univ., he became rector of Edinburgh High School in 1771. Among his students were Walter Scott, Jeffrey, and Brougham. He received the honorary degree of LL.D. in 1780. His *Roman Antiquities*, 1791, obtained continental fame. See A. Henderson, *Account of the Life and Character of Alexander Adam*, 1810.

Adam, de l'Isle, see VILLIERS DE L'ISLE-ADAM.

Adam, James (1730-94), 3rd son of Wm A., architect, of Kirkcaldy, Scotland; studied in Italy, 1760-3; then practised in collaboration with his brother Robert (q.v.). Probably designed most of Portland Place, London, 1776-80.

Adam, Juliette, Fr. author, née Juliette Lamber (1836-1936), b. Verberie, Oise. Married to a lawyer, la Messine, she pub. under that name *Blanche de Coucy, l'enfance*, in 1858, followed by *Idees antiproudhoniennes sur l'amour, la femme et le mariage*. After her second marriage, in 1868, to Edmond A., prefect of police, she wrote largely under her maiden name, among her later works being *Le Siège de Paris*, 1873; *Le Roman de mon enfance et de ma jeunesse*, 1902; *Mes premières armes littéraires et politiques*, 1904; *Mes sentiments et nos idées avant 1870*, 1905; *Mes illusions et nos souffrances durant le siège de Paris*, 1906; *L'Angleterre en Egypte*, 1922; *L'Egypte: une leçon diplomatique*, 1924. She founded the *Nouvelle Revue* in 1879, and her salon was politically influential.

Adam, Paul Auguste Marie (1862-1920), Fr. novelist, b. Paris. His first book was the Zolaesque *Chair molle*, 1885; the second, *Soi*, 1886, a study of feminine egoism. He devoted himself to historical investigation, distinguishing between stories of his own day (*L'époque*) and those of a former time (*Le Temps et la vie*). He wrote *Robes rouges*, 1891, and *Le Mystère des foules*, 1896. Then came 4 romances of the Napoleonic time: *La Force*, 1899; *L'enfant d'Austerlitz*, 1902; *La Ruée*, 1903; and *Au soleil de juillet*, 1903, in which he was greatly assisted by the recollections of his grandparents. See C. Maunclair, *Adam*, 1921.

Adam, Robert (1728-92), architect, b. Kirkcaldy, Scotland; 2nd son of Wm A., architect. Travelled in Italy, 1754; then in 1757 surveyed Diocletian's palace at Spalato in Dalmatia, on which he pub. a magnificent folio vol. in 1764. He was appointed 'Architect of the King's Works' jointly with Sir Wm Chambers (q.v.) in 1761. His prin. designs, among a very long list of buildings, were the Admiralty Screen, 1760; Lansdowne House, 1762-8; the Adelphi (with his brothers), 1768-72; Mansfield Street, 1770-5; 20 St James's Square, 1772-4; Apsley House, c. 1775; 20 Portman

Square, 1775-7; S. and E. sides of Fitzroy Square, c. 1790-1800—all in London; Kenwood, Syon House, Osterley House, Kedleston Hall, Harwood House—all these were remodelling of existing mansions; Luton Hoo; Mellerstain and Gosford House in Scotland; Charlotte Square, 1791, and the Register House, 1774-92, in Edinburgh; also Edinburgh Univ., 1789-91, completed by Playfair 1815-34; Glasgow Royal Infirmary (since rebuilt). He and his brother pub. in 1773-9 *The Works in Architecture of Robert and James Adam*. See biographies by J. Swarbrick, 1903; A. T. Bolton, 1922; J. Lees-Milne, 1948.

Adam de la Halle, or Le Bossu (b. 1240, d. 1285-8), Fr. poet and dramatist, b. Arras. He wrote *Le Jeu de la feuillée*, the first Fr. comedy (c. 1277), and at the court of Naples he composed the first known comic opera, *Le Jeu de Robin et de Marion*, c. 1283. A complete ed. of his works, by Coussemaker, appeared in 1872. See H. Guy, *Essai sur Adam de la Halle* (2nd ed.), 1923.

Adam of Bremen, Ger. historian and geographer, was b. in the 11th cent., but the dates of his birth and death and definite particulars of his life are unknown. In 1068 he was made canon of Bremen Cathedral under Archbishop Adalbert (q.v.), and principal of the cathedral school. In the years 1072-6 he was engaged in writing the *Gesta Hammaburgensis Ecclesiae Pontificum*, his hist. of Hamburg and the spread of Christianity in the N.; the best ed. of this book is by Lappenberg, 1876. He d. on 12 Oct., probably in 1076.

Adamant (Gk *adamas*, unbreakable), now used only poetically for a hard substance, was formerly synonymous with a diamond, and also by false etymology connected with the lodestone.

Adamantine Spar, aluminium oxide, the mineral substance ranking second to the diamond in hardness, found in various coloured and colourless forms. See CORUNDUM.

Adamawa, or Fumbina, region of W. Africa, lying partly in Nigeria and partly in the Cameroons. It is included in the N. areas of the mandated ter. of the Cameroons. It has a good climate and a fertile soil, but it is mainly a cattle-rearing country. The N. part of A. is traversed by sev. trade routes connecting Bornu and Dikwa with Yola and Garua. Over these routes go the natron and black salt from the N. to Benue, and in addition to this through traffic a large tonnage of ground-nuts and locally woven textiles is carried. It is watered by the Benue R., a trib. of the Niger. Exports include hides and skins and ground-nuts. It is named after a chief, Adama, who founded the Yola emirate. The chief tn is Yola (British), and other tns are Nauman and Jalingo (British) and Garua, Ngaundéré, and Lame (French). A. was visited by Heinrich Barth (q.v.), the Ger. explorer, in 1851. Pop. 400,000.

Adamites, name of a Gnostic sect of the 2nd cent. in Africa, who sought to re-establish the innocent state of man at the

time of the creation, going naked and rejecting marriage. The doctrine was prevalent among some of the Beghards or Brethren of the Free Spirit (q.v.) in the 14th cent., and a similar sect appeared in Bohemia and Moravia in the 15th cent. They were massacred by Ziska in 1421.

Adamnan, or Adomnan, St (c. 630-704), famous as the author of the *Life of St Columba*, was b. of a family called Hy-Neill, in Ulster. He received his education at the monastery of Clonard. In 679 he was appointed abbot of Iona. While visiting his pupil Aldfrid, King of Northumbria, he became converted by the Venerable Bede to an acceptance of the Rom. observance of Easter, and to the adoption of the regulation tonsure. He endeavoured to inculcate the same change of view among his own community, but failed, although some success attended similar efforts in Ireland. His feast is on 23 Sept.

Adams, Arthur Henry (1872-1936), New Zealand poet and novelist, b. Lawrence. He was educ. at Otago High School and Univ., and afterwards became a journalist in Australia, where he wrote poems, plays, and novels. His *Collected Verse* appeared in 1913. His novels are *Tussock Land*, 1904; *Galahad Jones*, 1910; *A Touch of Fantasy*, 1912; and *Grocer Greatheart*, 1915. He also wrote an autobiography, *A Man's Life*, 1929.

Adams, Charles Follen (1842-1918), Amer. dialect poet, b. Dorchester, Massachusetts. He fought at Gettysburg, and subsequently became a dry-goods dealer in Boston, diverting himself by writing poems in Ger. dialect like the Breitmann ballads. *Leedle Yawcob Strauss* (1876) made him famous. His collected poems were pub. in 1910.

Adams, Charles Francis (1807-86). Amer. diplomatist, son of John Quincy A. (q.v.), b. Boston, Massachusetts. Studied diplomacy under his father at an early age in Russia and England, and returning to Harvard graduated in 1825. Studied law, and sat in the Massachusetts House of Representatives and Senate. Sat as a Republican in Congress; was appointed minister to Great Britain in 1862. He opposed the sailing of the *Alabama*, and succeeded in influencing Lord John Russell in stopping the *Alexandra* and 2 ironclads intended for the Confederate states. He left England in 1868 and sat at the Geneva Conference (1871-2). He ed. the works of John A. (1850-6) and the memoirs of John Quincy A. (1874-7). See life by his son, C. F. Adams, jr, 1900.

Adams, Clement (c. 1519-87), schoolmaster and author, b. Warwicks. Educ. at Eton and Cambridge, he became schoolmaster to the king's pages of honour. His Lat. *Anglorum Navigatio ad Moscovitas* is an account of Richard Chancellor's voyage to Russia, the first Eng. venture into that country; it was printed by Hakluyt in his collections of 1589.

Adams, Francois (1796-1861), doctor and scholar, b. Aberdeenshire. He studied at Aberdeen and London and practised medicine at Banchory. He trans. and

ed. the Gk medical writers Paulus Aegineta, 1844-7, Hippocrates, 1849, and Aretaeus, 1856.

Adams, Francis William Lauderdale (1862-93), Australian poet and novelist, *b.* Malta, of Scottish parents. He joined the staff of the *Sydney Bulletin*, in which many of his poems appeared, but, depressed by an incurable lung disease, committed suicide at an early age. His best-known works are *Henry and Other Tales*, 1884; *Leicester*, an autobiographical novel, 1884; *Australian Essays*, 1886; *Poetical Works*, 1886; and *Songs of the Army of the Night*, 1888. His play, *Tiberius*, is striking and original.

Adams, Henry Brooks (1838-1918), Amer. historian, grandson of sixth president of the U.S.A.; *b.* Boston. Graduated Harvard, 1858. Travelled in Europe, 1858-60; in England, 1861-8, as secretary to his father, Charles Francis A., the Amer. minister. His *History of the United States from 1801 to 1817* (first pub. 1889-90) is a standard treatise. Wrote, besides many essays and studies, *Mont-Saint-Michel and Chartres*, privately printed 1904, pub. 1913, and an autobiography called *The Education of Henry Adams*, privately printed, 1906, pub. 1918. He d. at Washington.

Adams, James Truslow (1878-1949), Amer. historian, *b.* Brooklyn. Educ. at Yale, he accompanied Col. House on his mission to Great Britain during the First World War, and thereafter turned to writing hist., his work *The Founding of New England*, 1921, being awarded the Pulitzer Prize. He wrote sev. other books on New England, a hist. of *The Adams Family*, 1930, and some social studies, including *Our Business Civilization*, 1929, and *The American*, 1944.

Adams, John (1735-1826), second president of the U.S.A.; *b.* Quincy, Norfolk co., Massachusetts. Educ. at Harvard (1755), he was called to the Bar in 1758. He was one of the Massachusetts representatives in the Continental Congress in 1774, and a promoter of the Declaration of Independence, 1776. He became ambas. to Holland, 1782; to Great Britain, 1785; President of the U.S.A. 1797-1801. He pub. *A Defence of the Constitution of the United States of America* in 1787. See also UNITED STATES, *History*. See bibliography to *Works*, ed. by C. F. Adams 1850-6; *Letters of John Adams Addressed to His Wife*, 1840-1; *Familiar Letters of J. Adams and His Wife Abigail Adams*, 1876; J. T. Morse, *John Adams*, 1885; M. Chamberlain, *John Adams*, 1899.

Adams, John Couch (1819-92), astronomer, *b.* near Luncheonston. He and Leverrier share the honour of having worked out the position of the undiscovered planet Neptune in 1846 after noting the irregularities in the motion of Uranus. In 1859 he was appointed Lowndean prof. of astronomy and geometry at Cambridge. His later work was connected with the orbit of the Leonid meteors, the motion of the moon, and terrestrial magnetism.

Adams, John Quincy (1767-1848),

sixth president of the U.S.A. and eldest son of John A. (q.v.), second president, *b.* Quincy, Norfolk co., Massachusetts. He studied diplomacy in Europe under his father in 1778; returning to America he graduated at Harvard, 1788. He became ambas. at The Hague, 1794; to Prussia, 1797; to Russia, 1809; in London, 1815; secretary of state of the U.S.A., 1817; President, 1825-9; defeated by Jackson in 1828, he returned to Congress in 1831. See also UNITED STATES, *History*. See C. F. Adams (ed.), *Memoirs of John Quincy Adams*, 1874-7; J. T. Morse, *John Quincy Adams*, 1883; James Truslow Adams, *The Adams Family*, 1930.

Adams, Joseph Quincy (1881-1946), Amer. scholar. He was educ. at Chicago, Cornell, London, and Berlin Univs. and became prof. of English at Cornell. From 1931 till his death he was Director of the great Folger Shakespeare Library in Washington. His works include *Shakespearean Playhouses*, 1917, and *Chief Pre-Shakespearean Dramas*, 1927; he was also general editor of the *New Variorum Shakespeare*.

Adams, Maude (1872-1953), *b.* Salt Lake City, Utah. Her mother being an actress in a stock company, Maude began playing child parts at a very tender age, becoming in her young womanhood one of America's favourite actresses. She created many star parts in plays by Barrie and Edmond Rostand, and was an intimate friend of Barrie.

Adams, Samuel (1722-1803), Amer. statesman, *b.* Boston, Massachusetts, U.S.A. He graduated at Harvard College, 1740. He took the popular side in the disturbances caused by the Stamp Act, 1765, and in 1764-74 was a member of the legislature of Massachusetts. He signed the Declaration of Independence, 1776, and became lieutenant-governor, 1789-93, governor until 1797, of Massachusetts. He devoted his life to the cause of the Independence of America, and wrote political essays. He was called the Amer. Cato.

Adams, Thomas, Puritan preacher who fl. from 1612 to 1653, called by Southey 'the prose Shakespeare of Puritan theologians.' He wrote sermons and theological works, and from 1612 to 1623 held the positions of preacher at Willington, Beds, vicar of Wingrave, Bucks, and preacher at St Gregory's under St Paul's Cathedral.

Adams, William (c. 1540-1620), navigator, *b.* Gillingham, near Chatham, and apprenticed as a sailor when twelve years old. He became pilot-major to a fleet from Rotterdam which, though bound for India, reached Japan, where A. lived until his death, becoming second in command of an Eng. settlement founded 1613, and making voyages to Siam and Cochinchina.

Adam's Apple: 1. In common parlance, the boss or projection in the neck caused by the thyroid cartilage of the larynx, most prominently marked in the male.

2. In botany, the *Citrus limetta*, or sweet lime, a pale yellow, roundish fruit with a boss at the point. Its name, *pomo*

d'Adamo, was given by the Italians, who thought the depressions on the surface resembled the mark of Adam's teeth. It belongs to the Rutaceae, the orange and lemon family.

Adam's Bridge, Indian Ocean, is a chain of sand-banks which, with the Is. of Manaar and Rameswaram, extend from Ceylon to the S. coast of India. It has sev. navigable channels for small boats. In the *Ramayana* it is said to have been constructed by the monkey-god Hanuman for the passage of Rama from Madras to Ceylon.

Adam's Needle, see YUCCA.

Adam's Peak, well-known mt of Ceylon, is 7360 ft high. It obtains its name from the popular Mohammedan belief that Adam's penance took place here after his expulsion from Eden.

Adamson, Patrick (1537-92), b. Perth, graduated M.A., St. Andrews, 1558; became minister of Ceres, Fife, 1563. In 1566 he went to France, returning about 1572, when he became minister of Paisley, chaplain to the regent, and Archbishop of St. Andrews, 1576. He came into conflict with the Church, was sent as ambas. to Elizabeth by James VI, 1583, was charged with heresy and excommunicated, 1585. He was afterwards pardoned, but again excommunicated, 1588. He was the author of many theological works in Latin, both prose and verse.

Adamson, Robert (1852-1902), prof. of philosophy at Manchester, 1876, and of logic at Aberdeen, 1893, and Glasgow, 1895. Among his works on philosophical subjects are *Roger Bacon: the Philosophy of Science in the Middle Ages*, 1876; *On the Philosophy of Kant*, 1879; and *The Philosophy of Fichte*, 1881.

Adana, chief tn of the Turkish il (prov.) of Seyhan (q.v.), situated on Seyhan R. about 30 m. from the Mediterranean. Exports wool, cotton, and grain. Pop. 172,465.

Adanson, Michel (1727-1806), Fr. naturalist, b. Aix, d. Paris. He was destined for the Church, but gave up the study for that of natural hist. In 1748 he went to Senegal, where he made collections in every branch of natural hist. His *Natural History of Senegal* was pub. in 1757; he became a member of the Academy of Science, 1759; and his *Families of Plants* appeared, 1763. He was reduced to misery and poverty during the Fr. Revolution, but was invited to become a member of the Institute of France, and received a small pension from the Fr. Gov.

Adansonia, see BAOBAB.

Adapazari, tn in the Kocaeli il (prov.) of Turkey. An important railway junction, it is a centre of the linen and tobacco trade. During the past 45 years the pop. has more than trebled and is now (1955) 55,126.

Adaptation (Lat. *adaptare*, to fit to), process of acquiring a fitness for new circumstances or new purposes. In literature and music the term is used to denote the modification of some form of art to allow of its suitable expression in another form. Thus we speak of the

A. of a play from a novel; or of a poem to music, where certain stanzas are omitted to suit the considerations of length usually called for in a song.

In biology A. means the variations in the structure and behaviour of animals occasioned by the necessity for continuing to live or procreate under somewhat altered circumstances. The term is sometimes carelessly used as if it meant a kind of conscious striving after fitness, but when we say that a frog is adapted to its surroundings, we simply mean that it cannot live the life, say, of a cod-fish. In the process of evolution of a species, variation in characteristics occurs in 2 ways. First, there is the influence of heredity, which tends to perpetuate certain characteristics, perhaps in the direction of the parent away from the type, or as reverting to the type away from the parent. If the direction taken is one that leads to survival, the animal lives to carry on what is perhaps a long process of A. But every individual has a certain power of reacting to its environment, and tends to alter itself in its own life-hist. If the variation achieves the object of survival, it may be called an A. Thus we may say that every distinctive characteristic originated in an A., even when it is being slowly modified in the direction of extinction, for such modification is the response to the demand for an economy in which all that is useless must be abandoned.

Adar, last month of the Heb. year, corresponding to our Feb. Veadar (lit. 'and Adar') was the intercalary month introduced into 7 of the cycle of 19 years.

Adda (anct *Addua*), lt. riv. which rises in the Ortler Group (q.v.) of the Alps, and flows through Lake Como (q.v.) and SE. across the plain of Lombardy to join the Po (q.v.), 8 m. above Cremona. Length 140 m. See VALTELLINA.

Addams, Jane (1860-1935), sociologist, b. Cedarville, Illinois. Studied economic questions in Europe and America; in 1889 she helped to found in Chicago Hull House, a social settlement. She shared the Nobel peace prize in 1931, having done much to relieve post-war distress in Europe. (See her works *Twenty Years at Hull House*, 1910, and *The Second Twenty Years at Hull House*, 1930.) For 3 years she held the post of inspector of streets and alleys. See her *Democracy and Social Ethics*, 1902; *New Ideals of Peace*, 1907; *The Spirit of Youth and the City Streets*, 1909. See biography by J. W. Linn, 1935.

Addax, genus of antelopes belonging to the Hippotraginae and allied to the oryx, found in N. Africa and Arabia. The *A. nasomaculatus* is a large animal with a white band round its muzzle, called by the Arabs *Abou-Addas* and by Pliny *Strepsiceros* on account of its twisted horns.

Adder (A.-S. *naedre*, serpent), name applied to sev. poisonous snakes of the Viperidae and to some non-poisonous Colubridae. *Vipera berus*, the European A., attains a length of 28 in., and its bite is seldom fatal. Wycliffe applies the term to the serpent in the Garden of Eden.

Adder's Tongue, popular name for the fern *Ophitoglossum vulgatum*, which belongs to the Ophioglossaceae and is found in Britain. It develops only 1 leaf each year, and reproduces vegetatively by means of buds on the root.

Addington, Henry, see SIDMOUTH, VIS-COUNT.

Addis Ababa, or **Addis Abebe**, cap. of the Federation of Ethiopia and Eritrea. A. A., which means 'Little Flower,' has many fine modern buildings, including an opera house, completed in 1955, and modern hotels. It is the main centre of gov. and commerce and the official residence of Emperor Haile Selassie I. A. A. is connected with the coast by rail to Djibuti in Fr. Somaliland 486 m. away; and it is the H.Q. of the Ethiopian Airlines which operate an international as well as internal service to more than 30 places. Pop. (1956) of municipality, 401,915 (which includes 10,859 foreigners, mostly It.). In A. A. proper—pop. (1956) 306,759—161,627 are Amharas, the next most populous ethnological group being Gallas, 56,755. There were registered, in 1956, 46,257 Muslims and 254,036 followers of the Orthodox Coptic Christians. A. A. was the scene of one of the worst massacres in modern history when for 3 days, 19 Feb. 1937, on the orders of Graziani, the whole city was given over to mass murder and rapine by the Italians. At least 30,000 are said to have been killed, many of them herded into houses which were set on fire. The massacre followed an attempt on the life of Graziani.

Addiscombe, dist. of Croydon, Surrey, England, contained the college for cadets of the E. India Co. in which were trained sev. notable men, among others Sir Henry Lawrence, Lord Napier, and Lord Roberts. Pop. 16,300.

Addison, Christopher, 1st Baron (1869–1951), Brit. politician and medical prof. After a period as medical prof. at Sheffield he was elected Liberal member for Hoxton, 1910, becoming first parl. secretary to the Board of Education and then Minister of Munitions. Minister of Health, 1919–21, when he inaugurated the medical panel in the National Health Insurance scheme and organised the Coalition Gov.'s housing scheme. He resigned during disputes over the latter scheme and joined the Labour party. Minister of Agriculture and Fisheries, 1930–1. Raised to the peerage in 1937. Secretary of State for Dominion Affairs, 1945–7. Lord Privy Seal and leader of the House of Lords, 1947.

Addison, Joseph (1672–1719), essayist, poet, and statesman, b. Milston rectory, near Amesbury, Wilts, the son of Lancelot A., who was dean of Lichfield, 1683. He was educ. at Amesbury, Lichfield, and Charterhouse, where he was a fellow pupil of Richard Steele. At the age of 15 he went to Queen's College, Oxford; but 2 years later he obtained a scholarship and went to Magdalen College, where he obtained a demyship, 1689, and his M.A. degree, 1693. His facility in writing Lat. verse first brought him into notice, and his

verses addressed, in 1694, to Dryden procured him the friendship and interest of that poet. He became acquainted with Lord Somers and Mr Montagu, afterwards Lord Halifax, and it was through the influence of the former that he obtained, in 1699, a pension of £300 to enable him to travel on the Continent to qualify for diplomatic service. On the death of William III he lost his pension, and he returned to England late in 1703. In 1704, after living for some time in London in a state of poverty, he was appointed by the Gov. to write a poem to celebrate the victory of Blenheim. This poem, entitled *The Campaign*, was so successful that he was appointed a commissioner of appeals, and held sev. appointments, 1704–10. He became under-secretary of state, 1706, accompanied Halifax to Hanover, 1707, and was appointed secretary to Lord Wharton, Lord-Lieutenant of Ireland, 1708. In 1709 Steele began the *Taller*, and A. soon became a contributor, taking a leading part in its production. The first number of the *Spectator* appeared 1711, and it was continued until Dec. 1712 by A. and Steele. Then followed the *Guardian*, the first number of which was pub. in Mar., and the 175th and last in Oct. 1713; Steele was the editor, and A. a contributor. In the same year A. brought out his tragedy of *Cato*, which procured for him still greater fame than any of his former productions had done. In June 1714 appeared the first number of a continuation of the *Spectator*, to which A. contributed until its termination in Dec. 1714. His prose comedy *The Drummer* was pub. 1715, but it was not a success. He then launched a periodical pub. in support of the Gov. under the title of the *Freeholder*. It consisted of 2 papers a week, and was continued until June 1716. In the same year he married the dowager Countess of Warwick, and in 1717 was appointed secretary of state. However, he retired from office, 1718, on the ground of ill health, but really in consequence of his entire inaptitude for debate in parliament, and for the ordinary business of his office. His health soon began to fail, his domestic life was not happy, and he d. at Holland House, Kensington.

As a poet and dramatist A. formerly held a much higher place than he now does; his greatness lies in the fact that he is one of the most famous of all Eng. essayists. His style is easy, polished, and graceful, and his essays are characterised by a delicate sense of propriety, a lively fancy, and a most original and exquisite humour. He was the founder of a new school of popular writing, and his works had the object of raising the manners and standard of life of the people, and of forming a good taste and sound opinion. Although many have attempted to imitate him, none has surpassed him, and his contributions to the *Taller*, *Spectator*, and *Guardian* are both amusing and instructive, and suited alike to the gay and the serious. In character he was supposed to have been somewhat cold; nevertheless he was kind and

magnanimous; and the ease and grace of his manners and conversation made him both popular and admired.

Eds. of A.'s works by Tickell, 1721; Hurd, 1800-11; Greene, 1858. *Spectator*, ed. G. Gregory Smith, 1897-8; *Tatler*, G. A. Aitken, 1898. Letters ed. W. Graham, 1941. See also lives by R. Steele, 1724; L. Aikin, 1843; W. J. Courthope, 1884; P. Smithers, 1954; and in *Johnson's Lives of the Poets*, 1781.

Addison, Thomas (1793-1860), physician, b. Long Benton, near Newcastle upon Tyne. He received his medical education at Edinburgh Univ., where he graduated in 1815. In 1820 he entered Guy's Hospital, to which he was appointed physician in 1837. He was F.R.C.P. in 1838. During his life A.'s fame rested upon his eminence as a physician, his skill as a diagnostician, and his great ability as a teacher. To-day he is remembered for his original descriptions of a disease of the suprarenal capsules (Addison's disease, q.v.) and of pernicious (or Addisonian) anaemia (1849). With Richard Bright (q.v.) he wrote *Elements of the Practice of Medicine*, vol. 1, 1839; he contributed many valuable papers to *Guy's Hospital Reports*, notably on pneumonia, tuberculosis, skin diseases, and anatomy of the lung. His *Published Writings*, 1868, includes a biography. See also Wilks and Bettany, *History of Guy's Hospital*, 1892.

Addison's Disease, syndrome of signs and symptoms associated with hypofunction of the suprarenal glands (q.v.). Thomas Addison (q.v.), physician to Guy's Hospital, first described the condition in a paper read to the South London Medical Society in 1849. Later, in 1855, he pub. a monograph, *The Constitutional and Local Effects of Disease of the Suprarenal Capsules*. Of the 11 cases described by Addison, 6 showed destruction of the adrenal glands by tuberculosis, 4 by malignant growths, and 1 only showed atrophy of the glands from no obvious cause. A. D. is rare in children and in those over 60 years of age. It is commonest in the second and third decades. The main features of the disease are muscular weakness, fatigue, loss of appetite, loss of weight, low blood pressure, and pigmentation of the skin and mucous membranes. It is now known that the disorders of function associated with A. D. are caused by a deficiency of the hormones secreted by the cortex of the suprarenal glands. The nature and mode of action of 2 of these hormones, deoxycortone and cortisone (q.v.), have recently been discovered. Knowledge regarding 2 other adrenal hormones, the fat-controlling hormone and the pigment-controlling hormone, is incomplete. In addition to these 4 hormones, the suprarenals also secrete androgens, oestrogens, and progesterone, which are a group of sex hormones. Until the discovery and isolation of deoxycortone and cortisone as therapeutic substances, progressive A. D. was a fatal disease, complete absence of suprarenal hormones being incompatible with life. Treatment now consists in giving deoxycortone and/or cortisone by injection

or by mouth. In this way the natural hormones, which owing to the destruction of the suprarenal glands are absent from the circulating bloodstream, are replaced by artificial means. There is no cure for A. D. The most that can be done is to maintain life by supplying the body with the essential hormones which it is unable to manufacture for itself.

Addition (Lat. *addere*, to put to) is the putting together of 2 or more magnitudes.

In arithmetic and algebra it is the first rule denoting the putting together or adding of sev. numbers or quantities of the same kind into 1 number or quantity, called the sum or total. The sign of this operation is +, pronounced plus, the Latin for more. Thus 2 + 3 means the number 2 added to the number 3, and $a + b$ means the quantity a added to the quantity b , and represents the sum of a and b .

Addled Parliament, The, nickname of James I's second parliament, which sat in 1614, and did not pass a single Act. The king wished to obtain supplies without settling the question of imposts, but to this the members—among whom were Pym and Wentworth—would not agree, and James therefore dissolved it.

Address, **Forms of**. The form of A. to and between persons has lost much of the ceremony that characterised the custom a few generations ago. Many of the methods and terms used to-day would then have been serious breaches of etiquette, but are adopted now with a great freedom from due ceremony. The forms of A. should be as follows:

Ambassador, British. Address: 'His Excellency (according to rank), H.B.M.'s Ambassador and Plenipotentiary,' then 'Sir' or 'My Lord,' etc., according to status. In conversation use 'Your Excellency.' Respecting the ambas.'s wife, the form 'Your Excellency,' though not correct, is often used.

Archbishop. 'His Grace the Lord Archbishop of —, My Lord Archbishop.' Later references in the same communication, 'Your Grace.' In formal documents to the Archbishop of Canterbury the following is used: 'The Most Rev. Father in God (full Christian and surnames), by Divine Providence Lord Archbishop of Canterbury, Primate of All England and Metropolitan.' To the Archbishop of York: 'The Most Rev. Father in God (Christian name), by Divine permission Lord Archbishop of York, Primate of England and Metropolitan.' Irish archbishops are 'The Most Rev. the Archbishop of —,' but if the archbishop is a temporal peer 'The Right Hon. and Most Rev.' is used. Rom. Catholic archbishops in England and Ireland are addressed as 'The Most Rev.'

Archdeacon. 'The Venerable the Archdeacon of —, Venerable Sir.' Afterwards the same.

Baron. 'The Right Hon. Lord —,' or 'The Lord —, My Lord.' Refer to 'Your Lordship.'

Baron's daughter. If unmarried, 'The Hon. (Christian name and surname).'

If married, 'The Hon. Mrs (husband's surname).' Begin 'Madam.' If married to a baronet or knight, 'The Hon. Lady (husband's surname).' Begin 'My Lady.' If married to a peer, or the son of a duke or marquess, A. accordingly.

Baron's son. 'The Hon. (Christian and surname).' Begin 'Sir.' In Scotland the eldest sons of Scottish peers are addressed, 'The Hon. the Master of (peerage title).'

Baron's son's wife. 'The Hon. Mrs (husband's surname).' Begin 'Madam.' If the daughter of an earl, marquess, or duke, A. accordingly.

Baroness, in own right or husband's. 'The Right Hon. the Baroness —,' 'The Right Hon. Lady —,' or 'The Lady —.' Begin 'My Lady.' Refer to 'Your Ladyship.'

Baronet. 'Sir (Christian name and surname), Bart.' Begin 'Sir.'

Baronet's wife. 'Lady (surname).' Begin 'Madam.' Reference 'Your Ladyship.'

Bishop, abroad. See Bishop, Scottish. *Bishop, Anglican and Rom. Catholic.* 'The Right Rev. the Lord Bishop of London,' or 'The Lord Bishop of London.' Commence 'My Lord Bishop.' Refer to as 'Your Lordship.' A bishop is addressed in formal documents as 'The Right Rev. Father in God (Christian name), by Divine permission Lord Bishop of London.'

Bishop, Irish. 'The Right Rev. the Bishop of Ossory,' or referring to the Bishops of Meath and Tuam, 'The Most Rev.' Commence 'Right Rev. Sir,' or 'Most Rev. Sir.' Rom. Catholic bishops in Ireland, 'The Most Rev.'

Bishop, retired. 'The Right Rev. Bishop —,' or 'The Right Rev. —, D.D.' Begin 'Right Rev. Sir.'

Bishop, Scottish. 'The Right Rev. the Bishop of St. Andrews, Dunkeld, and Dunblane.' The Bishop Primus is usually addressed, 'The Right Rev. the Primus.'

Bishop, Suffragan. 'The Right Rev. the Bishop Suffragan of Bedford.' Commence 'Right Rev. Sir.'

Clergy. 'The Rev. (Christian and surname).' Begin 'Rev. Sir.' If the son of a duke or marquess, 'The Rev. Lord.' If the son of a viscount or baron, 'The Rev. the Hon. (Christian name and surname).'

Companion of an order of knighthood. The ordinary form is used with the addition of the initials C.B., C.M.G., C.I.E., as the case may be.

Consul, British. —, Esq., H.B.M.'s Agent and Consul-General, or 'Consul-General,' or 'Consul,' or 'Vice-Consul,' according to rank.

Countess. 'The Right Hon. the Countess of —.' Commence 'Madam.' Refer to as 'Your Ladyship.'

Dean. 'The Very Rev. the Dean of —.' Begin 'Very Rev. Sir.'

Doctor. The ordinary form of A. is used with the addition of the initials D.D., M.D., LL.D., Mus.D., etc.

Dowager. The widow of the holder of a peerage becomes a dowager on the marriage of her son. She is addressed

as 'The Dowager Lady —.' The same title can be held by more than one person, hence the term is used less frequently to-day, and an alternative form, e.g. 'The Right Hon. Helen, the Countess of —,' is used, distinction being made by the use of the Christian name.

Duchess. 'Her Grace the Duchess of —.' Begin 'My Dear Madam.' Refer to as 'Your Grace.'

Duke. 'His Grace the Duke of —.' Commence 'My Lord Duke.' Further reference, 'Your Grace.'

Duke's daughter. 'The Right Hon. Lady (Christian name and surname),' or 'The Lady (Christian name and surname).' Commence 'Madam.' A. later as 'Your Ladyship.' If married to a peer, A. in husband's rank.

Duke's eldest son and his children. The courtesy title is treated as if it were an actual peerage. The eldest son takes the grandfather's third title and is addressed as a peer.

Duke's eldest son's wife. As if she were the wife of an actual peer.

Duke's younger son. 'The Right Hon. Lord (Christian name and surname).' Commence 'My Lord.' Refer to as 'Your Lordship.'

Duke's younger son's wife. 'The Right Hon. Lady,' or 'The Lady (husband's Christian name and surname).' Commence 'Madam.' Later refer to as 'Your Ladyship.'

Earl. 'The Right Hon. the Earl of —,' or 'The Earl of —.' Commence 'My Lord.' Refer to later as 'Your Lordship.'

Earl's daughter. See Duke's daughter.

Earl's eldest son, and eldest son's wife. Regard the title, which is by courtesy, as an actual peerage.

Earl's younger son and his wife. See Baron's son and his wife.

Governor-General of Dominion or Colony, Governor of Colony. 'His Excellency the Governor-General (or Governor) of —.' Rank will determine the beginning. Refer to as 'Your Excellency.'

Judge, English or Irish. 'The Hon. Sir —,' if a knight, or 'The Hon. Mr Justice —.' Commence with 'Sir.' He is only addressed as 'Your Lordship' or 'My Lord' on the bench.

Judge, Scottish. Same as Lord of Session.

Judge of County Court. 'His Honour Judge —.' Refer to, when on bench, as 'Your Honour.'

Justice of Peace, in England only. When on bench only use 'Your Worship.'

King. 'The King's Most Excellent Majesty.' Commence 'Sire,' or 'May it please Your Majesty,' or in the case of a Lord, 'Lord — presents his duty to Your Majesty.' Reference, 'Your Majesty.'

King's Counsel. Ordinary A. with K.C. added.

Knight Bachelor. Same as Baronet with Bart. omitted.

Knight Commander of the Bath, of St Michael and St George, or of the Star of India. 'Sir (Christian name and surname),' with the initials K.C.B.,

K.C.M.G., or K.C.S.I., according to designation. Commence 'Sir.'

Knight of the Garter, or of the Thistle, or of St Patrick. Ordinary knight A. with initials K.G., K.T., or K.P. added.

Knight's wife. See Baronet's wife.

Lord Advocate of Scotland. 'The Right Hon. the Lord Advocate.' Begin 'My Lord.'

Lord Chancellor. 'The Right Hon. the Lord High Chancellor.' Rank will determine beginning.

Lord Chief Justice. 'The Right Hon. the Lord Chief Justice of England.' If a peer commence according to status, otherwise, same as judge.

Lord High Commissioner to the General Assembly. His Grace the Lord High Commissioner.' Commence according to peerage rank. Reference, 'Your Grace.'

Lord Justice-Clerk. 'The Right Hon. the Lord Justice-Clerk.' Commence 'My Lord,' and refer to 'Your Lordship.'

Lord Justice-General of Scotland. 'The Right Hon. the Lord Justice-General.' Begin with 'My Lord,' and refer to 'Your Lordship.'

Lord Justice of Appeal. 'The Right Hon. the Lord Justice —,' or the 'Right Hon. Sir —.' Begin and refer to as for judge.

Lord Mayor of London, York, or Dublin. 'The Right Hon. the Lord Mayor of London,' or 'The Right Hon. —, Lord Mayor of London.' Commence 'My Lord,' and refer to 'Your Lordship.'

Lord Mayor's wife. 'The Right Hon. the Lady Mayoress of —.' Commence 'Madam.' Refer to 'Your Ladyship.'

Lord of Appeal in Ordinary and wife. See Baron and Baroness. Children do not take any title.

Lord of Session in Scotland. 'The Hon. Lord —.' Commence with 'My Lord,' and refer later to 'Your Lordship.' The wife has no title.

Lord Provost. 'The Right Hon. the Lord Provost of Edinburgh,' 'The Hon. the Lord Provost of Glasgow,' 'The Lord Provost of Aberdeen' (or of Perth). Commence with 'My Lord Provost,' or 'My Lord.' Refer to 'Your Lordship.' Wife has no title.

Maid of Honour. 'The Hon. Miss —.' Commence 'Madam.'

Marchioness. 'The Most Hon. the Marchioness of —.' Commence 'Madam.' Refer to 'Your Ladyship.'

Marquess. 'The Most Hon. the Marquess of —.' Commence 'My Lord Marquess.' Refer to 'Your Lordship.'

Marquess's daughter. See Duke's daughter.

Marquess's eldest son. See Duke's eldest son.

Marquess's younger son. See Duke's younger son.

Mayor. 'The Right Worshipful the Mayor of —.' Begin 'Sir.' Refer to 'Your Worship.'

Member of Parliament. M.P. is added to the usual form of A.

Minister Resident. —, Esq. (or according to rank), H.B.M.'s Minister Resident.'

Officers in the Army and Navy. The professional is prefixed to any other rank, e.g. 'Admiral the Right Hon. the Earl of —,' 'Lieut.-Col. Sir —, K.C.B.' Officers below captain in the Army or commander in the Navy are usually addressed by their civil rank with the initials of their corps, e.g. R.A., R.E., added.

Premier. According to rank.

Prince. 'His Royal Highness the Duke of —,' if a duke. Otherwise 'His Royal Highness Prince (Christian name).' In both cases commence 'Sir.' Refer to 'Your Royal Highness.'

Princess. If a duchess 'Her Royal Highness the Duchess of —.' Otherwise 'Her Royal Highness the Princess (Christian name).' Commence 'Madam,' and refer to 'Your Royal Highness.'

Principal of a Scottish University. If a clergyman 'The Very Rev. the Principal of —,' or 'The Very Rev. Principal (surname).'

Privy Councillor. 'The Right Hon.,' followed by name and title. Rank will determine beginning and reference.

Queen. 'The Queen's Most Excellent Majesty.' Commence 'Madam,' or 'May it please Your Majesty.' Otherwise, 'Lord — presents his duty to Your Majesty.' Reference 'Your Majesty.'

Recorder. 'Sir,' 'Your Worship,' 'The Worshipful' (London only), 'Right Worshipful.'

Secretary of State. 'His (or Her) Majesty's Principal Secretary of State for the — Department.'

Sheriff of London. 'The Right Worshipful.'

Viscount. 'The Right Hon. the Lord Viscount —.' Commence 'My Lord.' Refer to 'Your Lordship.'

Viscount's daughter, son, and son's wife. See Baron's daughter, son, and son's wife.

Viscountess. 'The Right Hon. the Viscountess —,' or 'The Viscountess —.' Begin 'Madam.' Refer to 'Your Ladyship.'

Correspondence between equals loses much of its formality, e.g. 'My dear Lord.' Persons of no superior rank usually adopt 'Sir,' 'Dear Sir,' or 'My dear Sir,' according to the degree of familiarity existing between them. To a firm 'Gentlemen' or 'Sirs' is usually the form.

In the U.S.A. the President, Governors, and all ambas. are addressed as 'His Excellency.' The Vice-President, heads of Executive Depts, Justices of the Superior Courts, mayors of tns, Senators, Congressmen, Consuls, Lieutenant-Governors, and the heads of State depts are addressed as 'The Hon.'

Addua, see ADDA.

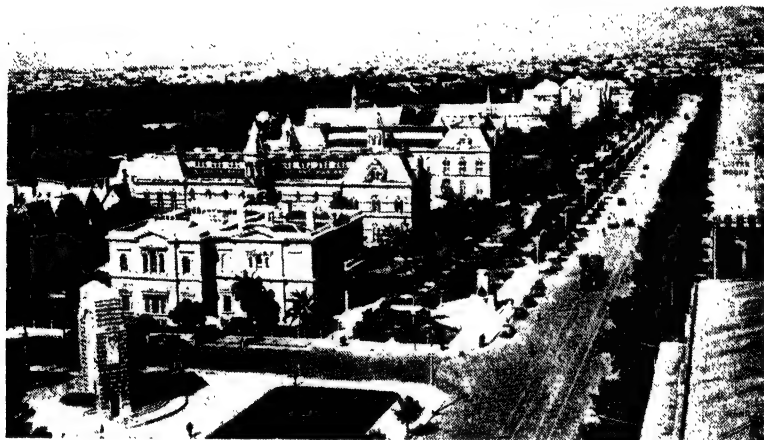
Ade, George (1866-1944), Amer. humorist and playwright, b. Kentland, Indiana. He studied science at Purdue Univ., and after some years as a journalist started an original line with *Fables in Slang*, 1900. These moral tales of modern life, in a vernacular of his own devising, were so successful that he wrote half a dozen vols. of them under various titles. He also

wrote novels and a number of successful plays, including *Speaking to Father*, 1923, and *The College Widow*, 1924.

Adelaer, Kurt Sivertsen (1822-75), Dutch admiral of Norwegian birth, who assisted Venice against the Turks (1654), and was so successful in many naval battles that Frederick III, King of Denmark, made him admiral of the Dan. fleet, 1662, and gave him the title of A.

Adelaide (Amelia Adelaide Louisa Theresa Caroline) (1792-1849), Queen of Great Britain, wife of William IV, eldest daughter of George, Duke of Saxe-Coburg-Meiningen. She married William,

city. The belt of park lands encircling the city, preserved in the original plans, has been maintained and now provides A. with one of its notable charms. Bridges communicate between the N. and S. parts, and the streets are wide and well paved. The chief business dists. are Rundle and Hindley, Currie and Grenfell Sts, while King Wm St, about a mile long, is one of the finest traffic avenues in Australia. Four roadways, facing the cardinal points of the compass, known as N., S., E., and W. Terraces, are in the S. part. The classic *pièce de résistance*, approached from the new railway station,



Fox Photos

ADELAIDE: NORTH TERRACE EAST

On the left is the national war memorial; the three buildings to the right of it are the circulating and public libraries and the museum.

then Duke of Clarence, in 1818. She helped to raise the moral standard of life at court, and was a devoted wife to William. All their children *d.* in infancy. See M. Hopkirk, *Queen Adelaide*, 1946.

Adelaide, cap. of S. Australia, on the Torrens R., 7 m. by rail from Port A. on the Gulf of St Vincent. It was founded in 1837, and named after the queen of William IV; and owing to the discovery of gold soon became an important city. It is situated on a large plain, bounded on the S. and E. by the Mt Lofty Range, and is the one Australian city planned at the outset with some coherent regard for principles. There are no slums. Modelled on the Gk ideal, A. is commonly named 'the Athens of the S.' Admirable foresight was shown in the laying out of the city, which is square in form and divided by the R. Torrens into 2 parts, the N. being the residential, the S. the business centre; the suburban area, however, has expanded considerably all around the

is N. Terrace, which is planned like a Parisian boulevard with lawns and flower-beds. Here are situated the museum, art gallery, parliament house (built of S. Australian marble), Gov. House, the hospital, and the leading clubs. A. is rich in marble statues. The national war memorial of marble, very large in scale, representing the Prologue and Epilogue of War, stands in front of Gov. House. A bronze equestrian statue at the corner of King Wm St commemorates the S. Australians who fell in the S. African War. There is also a bronze in Creswell Garden near the A. Oval to the memory of Sir Ross Smith, K.B.E., M.C., the aviator. Other notable public buildings are those of the univ., which plays a large part in the cultural life of the city and the state; the Anglican cathedral of St Peter's; and the Rom. Catholic cathedral. The botanic gardens and park and zoological gardens are 120 ac. in extent. A. is connected by rail

with Sydney, Melbourne, Perth, Brisbane, and other important tns and is the terminus of the overland telegraph from Port Darwin. There are also trolley and motor buses, and the tramway system's metropolitan and suburban routes cover 149 m. of single track. The water supply is good and is obtained from the catchment areas of the Onkaparinga and Torrens, and is stored in 5 reservoirs. A. is the emporium for S. Australia, exporting through Port A. wool, wheat, flour, and silver and copper ore. There are hardware, sheet-metal, and motor body building works. Pop. 500,000.

Adeler, Max (Charles Heber Clark) (1841-1915), Amer. author and journalist. He was on the editorial staff of the *Evening Bulletin*, Philadelphia, and ed. the *Manufacturer*. Among his works, mostly humorous, are *Out of the Hurly-Burly*, which procured him worldwide fame in 1874; *Elbow-Room*, 1876; *Random Shots*, 1879; *The Quakeress*, a novel, 1905; *By the Bend in the River*, short stories, 1914. Though in literature the most irresponsible of jokers, he was a very serious politician—a high tariff protectionist.

Adelges, formerly Chermes or Kermes,



Bedford Lemere

THE OLD ADELPHI TERRACE

'*Adelaide Advertiser*,' morning daily newspaper, estab. 1858, with a present circulation of over 170,000 daily. A. A. Newspapers Ltd also controls a network of 4 broadcasting stations and has a half-interest in the only Sunday newspaper pub. in S. Australia. The company's pubs. include the *A. Chronicle*, a weekly newspaper devoted to primary industries.

Adelard of Bath (12th cent.), philosopher and one of the most learned men of medieval times. After studying in France he travelled in Spain, Italy, N. Africa, and Asia Minor. He trans. Euclid's *Elements* from the Arabic, and wrote, between 1113 and 1133, a celebrated work *De Eodem et Diverso* (On Identity and Difference). It establishes him as the founder of the doctrine of indifference, according to which genus and species retain their identity in the individual. There is an ed. of *De Eodem et Diverso* by H. Willner (1903). See L. Thorndike, 'Adelard of Bath and the Continuity of Universal Nature' in *Nature*, xciv, 1915.

genus of minute gall-lice or aphids which infest conifers, particularly Norway and Sitka spruce. Typical is *A. abietis* of which the young insects feed at the base of leaf needles in spring, causing swellings or galls like false cones, which eventually contain 100 or more cavities, each harbouring sev. young aphids. The galls open in June; the escaping aphids are winged and fly to infest secondary hosts, such as larch, pine, or silver fir, for sev. generations, without forming galls, producing a winged generation in July of the second year, which flies back to the spruce to lay eggs and repeat the life cycle. *A. cooleyi* infests Douglas fir and Sitka spruce; *A. nusslini*, silver fir. Infestation of primary host shows in galls, of secondary host in small specks of sticky white down on leaf needles. Die-back of stems may follow, but damage is rarely severe on trees grown under suitable conditions.

Adelle Land, see TERRE ADÉLIE.

Adelphi, dist. S. of the Strand, London, deriving its name from *Adelphoi* (Gk,

'brothers') because its development was due to Robert Adam (q.v.) and his brothers James and Wm. They obtained a 99-year lease in 1768 from the Duke of St Albans for an area largely co-terminous with the site and grounds of the famous Durham House which had stood there since the early 13th cent. Land had to be reclaimed from the Thames, and great arched vaults served as foundations for the houses nearer the riv. Owing to the charm of its architecture and a fine situation the A. became a favoured residential dist. There have been many distinguished residents, including Garrick and G. B. Shaw. Latterly the character of the dist. has altered considerably, and very little remains of the Adam archi-

tecture. In 1935-8 the very fine A. Terrace was replaced by the large block of office buildings known as The A. There were at one time 4 streets in honour of the Adam brothers: Adam Street, Robert Street, John Street (now John Adam Street), and William Street (now Durham House Street). There has always been uncertainty about the part taken in the scheme by Robert Adam's brothers, but it appears that James and Wm had a little and John had nothing to do with it. See Charles Pendrill, *The Adelphi*, 1934.

Adelsberg, see POSTOJNA.

Adelung, Johann Christoph (1732-1806), Ger. linguist, lexicographer, and

grammarian, b. at Spantekow near

Anklam, Mecklenburg, and d. at Dres-

den. He devoted his time to trans. work,

philology, and languages, and was librar-

ian to the electoral library, Dresden, from 1787. His works include *Geschichte*

der Kultur, *Deutsche Sprachlehre für*

Schulen, *Umständliches Lehrgebäude der*

deutschen Sprache, *Grammatisch-kritisches*

Wörterbuch der hochdeutschen Mundart, and

Mithridates oder allgemeine Sprachen-

kunde.

Ademption means the revocation or

taking away of a grant or legacy. Thus

if a testator leaves a specific article in

his will, and before his death the nature

of the article or property bequeathed is

entirely changed, the legatee is said to suffer

from A., i.e. he gets nothing. The word

is also used in the legal sense of 'satis-

faction,' e.g. if a testator owing money

make a creditor a beneficiary under his

will to the same amount as the debt, or

more, then the legacy is held to have

extinguished the debt.

Aden, Brit. tn and Crown colony, which

also gives its name to the gulf of Aden, as

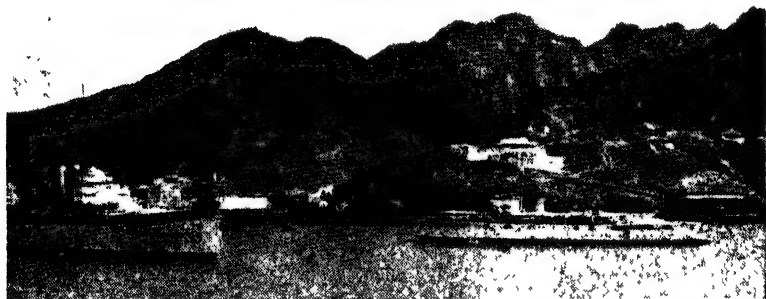
well as to the adjoining protectorate

(see below). It is the most populous and

important port of Arabia, and the total

pop. of the colony is 140,000 in an area of

75 sq. m. The tn stands at the end of a



ADEN HARBOUR

Fox Photos

rocky peninsula (which is joined to the

mainland by a narrow sandy isthmus not

1 m. wide), and is heavily fortified, being

indeed the only fortified point between

Egypt and Bombay. The Camp, as it is

called, or A. proper, stands in the crater of

an extinct volcano. Arid rocks surround

it, rising at the highest point to 1725 ft,

and the mean ann. temp. is 83° in the

shade. The other centres of pop. are

Steamer Point and Sheikh Othman,

towards the interior, and the Little A.

peninsula, site of a large oil refinery. A.,

a most prosperous tn under medieval

Turkish rule, was inhabited by 500-600

Arabs at the time Capt. Haines annexed

it after an almost bloodless coup (1839).

A system of rain-collecting cisterns was

once the chief source of water supply,

but water is now obtained from bore-

holes at Sheikh Othman, and the cisterns

(which are of unknown origin) are now

only of historical interest. By the

convention with Turkey the old bound-

ary, delimited in 1905, was extended

to a point on the coast opposite Bahrein

(q.v.) on the Persian Gulf. Adminis-

trative control used to be exercised

through the Gov. of India, the Colonial

Office being responsible for political

questions. In 1932 A. was separated

from the Bombay Presidency and formed into a prov. under a chief commissioner under the direct control of the Gov. of India. But it ceased to be a part of Brit. India in 1937, and is now a Crown colony under a governor, who is assisted by an executive council and a legislative council. The chief industries are salt and cigarette manuf., and the total sea-borne trade was estimated at £73,600,000 (imports) and £62,700,000 (exports) in 1955. The trade of A. decayed after the Portuguese discovery of the Cape route, but with the opening of the Suez Canal A.'s old importance revived, and it is now a most important oil bunkering and coaling station and port of call, besides being an emporium for the trade of the adjacent African and Arabian coasts. The Brit. Gov. has treaty engagements with, and subsidises, the neighbouring Arab tribes from the strait of Bab-el-Mandeb to Muscat. There is a court of unlimited civil and criminal jurisdiction, called the Supreme Court, from which certain appeals lie to the E. African Court of Appeal at Nairobi.

Perim, a small unfortified is. of 5 sq. m. (pop. 300), is included in the colony of A. The is. of Kamaran on the Red Sea about 200 m. N. of Perim, taken by Britain in 1915, is also under the control of the gov. of Aden. It is 22 sq. m. in extent (pop. 2200).

Aden Protectorate, a protectorate of approx. 112,000 sq. m. with an estimated pop. of 600,000, divided into a W. part, consisting of a score of sultanates, the chiefs of which, including the Sultan of Lahej, are in protective treaty relations with the Brit. Gov.; and an E. part, comprising the Hadhramaut (consisting of the Quaiti state of Shihr and Mukalla, and the Kathiri state of Seiyun), the sultanate of Qishn and Socotra, and the Wahidi sultanates of Bir 'Ali and Balihaf, all of which enjoy protective treaty relations with Britain. The Hadhramaut is the most important and best organised of the areas of the E. protectorate. The protectorate is bounded on the E. by the Qara country, which is part of the ter. of the Sultan of Muscat and Oman, and on the N. and W. by the Great Desert and the kingdom of the Yemen, whose S. boundary was provisionally fixed by the treaty of Sanaa (1934), by which the Brit. Gov. and the Imam Yahia of the Yemen agreed to maintain the *status quo* frontier as it was at the date of the treaty. The coastline of the protectorate, which is about 600 m. long, begins in the W. from Husn Murad, opposite Perim, and runs eastward to Ras Dharbat 'Ali, where it meets the sultanate of Muscat. The Mahri sultanate of Qishn and Socotra is the most easterly part of the A. protectorate, being bounded on the E. by Muscat and Oman. The Sultan of Qishn resides on Socotra Is. (1400 sq. m.), which lies 150 m. from Cape Guardafui. This is. was occupied by the E. India Co. in 1834 and came under Brit. protection in 1886.

Adenauer, Konrad (1876-), Ger. politician, educ. Freiburg, Munich, and Bonn Univs. He became a lawyer in

Cologne, was deputy-mayor, 1906, senior deputy-mayor, 1909, and lord mayor, 1917-33. He was again lord mayor of Cologne, 1945, but dismissed by Allied Military Gov., 1946. A prominent member of the Centre party (Catholic), he was dismissed from all his offices by Goering in 1933 and was imprisoned on political grounds for short periods by the Nazis in 1933 and 1944. He remained out of public life during the Nazi regime.



Embassy of the Federal Republic of Germany

DR KONRAD ADENAUER

After the Second World War A. was a foundation member of the Christian Democratic Union party, and its president in the Brit. zone of Germany, 1946-8. He represented N.-Rhine-Westphalia in the parl. council of the 3 W. zones, 1948-9, being president of the parl. council for most of this period.

In the elections held in the newly estab. Federal Ger. Rep. in Aug. 1949 A.'s party gained most seats in the Bundestag, and, by allying with other smaller groups, had a clear majority over its prin. opponents, the Social Democrats. The following month A. was elected first Chancellor of the Federal Rep. by the Bundestag. He combined the office with that of foreign minister. In the elections of 1953 the Christian Democratic Union increased their representation and A. was re-elected Chancellor. He relinquished the post of foreign minister in 1955.

A. has been a strong advocate of Federal Germany's participation in the defence of W. Europe against Communism, and much of his chancellorship has been taken up with problems relating

to the Ger. defence contribution, about which he has had to fight hard against the prin. opposition party, the Social Democrats. Though devoted to the cause of Ger. reunification, A. has throughout maintained that, whatever Russian declared policy, truly democratic reunification cannot be hindered in any way by Federal Germany being able to negotiate from a position of strength and security such as membership of N.A.T.O. gives her. In 1955 he visited Moscow, as a result of which diplomatic relations were estab. between Russia and Federal Germany, and sev. thousand Ger. prisoners still held in the Soviet Union sent home.

Adenitis (Gk *adēn*, a gland), term used in medicine to indicate inflammation of the lymphatic glands. It may be either acute or chronic. The function of lymphatic glands (or nodes) is to act as filters in the lymphatic drainage system. A., therefore, is a symptom, as a rule, of some disease process within the area of the body that is drained by the lymphatic channels on which the affected lymphatic glands are situated. In acute A. the disease is usually an infected wound or sore, the invading micro-organisms being carried away by the lymphatics and trapped in the glands, where, in turn, they set up inflammation and sometimes suppuration. Chronic A. may be due to a chronic infection, such as tuberculosis (q.v.). Lymphatic glands are also the seat of secondary cancer (q.v.), the malignant growth cells being carried along the lymphatic channels from the primary cancer. A blood disease, lymphadenoma or Hodgkin's disease, causes enlargement of the lymphatic glands.

Adenoids, or **Adenoid Growths**, enlargement of the lymphatic tissues at the back of the nose and throat. The condition occurs mainly in young children, and is evidenced by mouth-breathing (due to obstruction of the nasal air passages), liability to colds and irritable cough, nasal speech, and a characteristically dull facial expression. A. are frequently associated with chronic tonsil sepsis, and the infection spreads up through the Eustachian tubes (q.v.) to the middle ear and is a common cause of *otitis media*. Deafness in children is often caused by adenoidal obstruction of the Eustachian tubes.

Aderbaizan, see AZERBAIJAN.

Adersbach, see ADERSBACH.

Adhesion, in physics, the molecular force between masses or particles of different substances, as distinct from cohesion, the force between parts of the same substance.

Adhesion, in botany, the union of different organs.

Adhesion, in pathology, denotes union of two surfaces by the production of lymph after inflammation. It occurs, for example, after pleurisy (q.v.) when the two layers of the pleura adhere together. Peritonitis (q.v.) is also the cause of A. between peritoneal surfaces, and A.s may occur after abdominal operations. Sometimes intestinal obstruction results from peritoneal A.s. A.s of the two layers of

the pericardium (see HEART) may follow pericarditis. Normal healing of a wound by 'first intention' is an example of A.s performing a beneficial role.

Adhesives are prepared from many naturally occurring substances, starch, casein, bones and skins (see GLUE), and exudations of trees. A. are also prepared from synthetic resins (q.v.).

Starch, usually provided from maize, farina, tapioca, or sago, is prepared by disintegrating the vegetable matter and separating the starch granules by flotation. The whole process is carried out in the cold. When the starch is used as an adhesive, it is gelatinised in water either by heat or chemical action. Dextrin derived from starch is a material of widely varying properties according to manufacturing conditions. This is obtained from starch either by acid roasting, enzyme action, or acid hydrolysis. Dextrin is used as an adhesive either as a simple solution in water or modified by the action of chemicals, generally borax and other alkalis. **Casein** is prepared from sour milk by either acid or rennet processes. Acid casein is generally preferred for A. The casein can be dissolved to form an adhesive in two ways, either by the action of borax and other alkalis or by dissolving the casein in a strong solution of urea. Casein A. can be made waterproof by sev. means. **Exudations of trees** include natural rubber latex and numerous natural gums such as arabic, tragacanth, and karya. Natural rubber latex is the liquid collected as a result of incisions in the bark of *Hevea brasiliensis*. This is stabilised by the addition of ammonia and preservatives and concentrated by centrifuging. **Gum arabic** (*Acacia*) is a solid resinous exudation from many species of *Acacia leguminosae*, used as a viscous solution in water plus some glycerine. It is widely used as a re-moistening gum, e.g. on postage stamps. **Gum tragacanth** (gum hog tragacanth) is a solid leaf-like exudation from many Asiatic species of *Astragalus leguminosae*. Preparation and use are similar to gum arabic.

Some A. have particular application for special work. Thus **Canada balsam** is a resin obtained by piercing the bark of the Amer. balsam fir. Its chief property is its transparency when set, which makes it eminently useful in optical work for cementing together glass surfaces. **Paste** is used for cementing paper and is made from flour or starch, the flour being rubbed up with water and boiled. The addition of water before boiling improves the quality, making it thinner and stronger. In large quantities, for wall-papering and bill-sticking, it can be made by mixing a quarter of flour with a quarter of a pound of alum into a creamy consistency with warm water, and then pouring on boiling water and stirring. As this paste is liable to become mouldy and putrid, it can be made permanent by the addition of a little corrosive sublimate. **Liquid glues** are prepared from shellac, which is caused to dissolve by boiling with borax. **Red cement**, or Faraday's cement, is used by instrument-makers for cementing glass to

metals. It is made by melting five parts of black resin with one part of yellow wax and then stirring in gradually one part of red ochre in fine powder and previously well dried. *Mastic cement* is made by mixing twenty parts of well-washed and sifted sharp sand with two parts of litharge and one of slaked lime. This is mixed with linseed oil, which sets by its property of absorbing oxygen. It is used for repairing stone-work. Sodium silicate is also used for closing the pores and resisting attack. See also GLUE and SYNTHETIC RESINS.

Adiabatic, without transference of heat. If a change takes place in a system, and no heat enters or leaves during the process, the change is said to be an A. change. Rapid changes of pressure in gases, e.g. sound waves, are usually A. provided that the walls of the container are poor thermal conductors and thermal radiation is excluded. See THERMODYNAMICS.

Adiabene, region of N. Mesopotamia E. of the Upper Tigris, conquered by Trajan. In the Christian era it was trib. to the Parthians.

Adiantum, genus of ferns of the Polypodiaceae, which usually inhabit damp tropical woods. *A. capillus-veneris*, the maidenhair fern, is found rarely in Britain and Europe. About 200 species of A. are known.

Adiaphora (Gk. 'indifferent things'), word signifying such actions as the Stoics held to lie in the border region between good and evil. The Adiaphoristic controversy in the Ger. Protestant Reformation arose from a dispute over certain Catholic tenets. Seeking to reconcile his Catholic and Protestant subjects, the Emperor Charles V in 1548 drew up a temporary ritual and rule of faith pending the settlement of the matter by a general council. The A. were those customs and tenets declared in the Leipzig Interim by Melancthon and his followers to be indifferent. Luther and his supporters opposed this distinction.

Adige (Ger. *Etsch*, anct. *Athesis*), riv. of Italy, which rises in the Rhaetian Alps (q.v.), and flows E. to Merano, then S. past Bolzano, Trent, and Rovereto into the plain of Lombardy, then SE. past Verona, and finally reaches the Adriatic just N. of the Po (q.v.). After the Po it is the chief riv. of Italy; it is deep, and below Verona has a width of about 500 ft. but its rapid current makes navigation difficult. Many battles have been fought on its banks; in particular it was the scene of an Austrian defeat in 1799. Length 252 m.

Adigherat, or **Adigrat**, small tn of Tigré, Ethiopia, which, prior to the It. invasion of 1936, had an important market, and is of historical interest.

Adipic (Lat. *adeps*, thick) **Acid**, crystallised solid acid, obtained by the oxidation of certain fatty or waxy bodies. It is a dibasic acid, akin to oxalic and succinic acids. It is used in the manuf. of nylon 66.

Adipocere, wax-like substance produced by the exposure of fleshy tissue to moisture with the exclusion of air, as in the earth or under water. Human bodies in moist burial-places often undergo this change.

Adipose Tissue, collection of fat within the body of an animal. It consists of minute cells containing a secretion of oily matter. A substance is what is known as a connective tissue, i.e. it constitutes a sort of packing material between the harder tissues which form the framework of the body. Its uses are to protect the organs from external changes of temp. and to constitute a reservoir of material which may serve as food when other supplies fail. An excessive amount of A. T. is developed in the course of some diseases.

Adirondack Mts, very beautiful group in the N. of New York state, U.S.A. They may be regarded as the continuation of the Alleghenies, and they terminate abruptly in sheer cliffs on the shore of Lake Champlain. They stand on a plateau 2000 ft above sea level, cover an area of 5000 sq. m., and their highest peak, Mt Marcy, has an altitude of 5345 ft. The dist. abounds in lakes and waterfalls, and here are the head streams of the Hudson. A forest reserve of 4375 sq. m. is owned by the state. A certain amount of lumbering is carried on, but the region is principally noted for being a favourite summer resort.

Adit, horizontal entrance to a mine, sometimes called a drift. See MINING.

Adjective (Lat. *adjectivus*, added), name of one of the parts of speech used with a noun, or substantive, to express a quality of the thing named or something attributed to it; to limit or define it; or to specify or describe a thing, as distinct from something else. Thus in the phrase 'a good man,' 'good' is the A., and expresses the quality of the man.

Adjudication, an **Order of**, in Eng. law, is the order of a court adjudging a debtor a bankrupt and appointing a trustee to administer his estate. In Scots law A. means a process to attach the heritable property of a debtor—not necessarily a bankrupt. See BANKRUPTCY.

Adjustment of Average, term used in marine and fire insurance, but mainly in the former, to denote the settling of the amount to be paid by the underwriters to the insured person and each underwriter's share of the loss. The rules relating to the amounts to be made good vary in different countries. In the absence of agreement, adjustment of the amounts to be contributed in respect of general average will take place at and according to the law of the port of discharge, i.e. in general, the place to which the vessel is destined, unless the voyage is justifiably terminated at an intermediate port. See INSURANCE.

Adjutage, or **Ajutage**, tube attached to an orifice through which water is discharged. See HYDRAULICS.

Adjutant, army officer, not above the rank of major, often a captain, and sometimes a subaltern, who assists the officer commanding a battalion or regiment, particularly in the carrying out of administrative work. His duties are multifarious and include that of aide-de-camp in the field. He has charge of the correspondence and official records, and keeps the accounts. The officers' duty roster is prepared by him, he issues by the authority of

the commanding officer the daily orders, and is generally responsible for the discipline and efficiency of the unit. He supervises the drilling of recruits, and acts as prosecutor in all courts martial that concern his men. The appointment is held for about 4 years; in the auxiliary forces for 5 years. The *A.-General*, who is the second military member of the Army Council, has duties towards the army as a whole somewhat similar to those of the A. to his unit, i.e. he is entrusted with all matters pertaining to discipline and efficiency of the troops.

Adjutant (*Leptoptilos dubius*), bird of the stork family found in various parts of India, but more especially in the N. and near water. It resembles somewhat the marabou stork of Africa, but is larger, and when erect it stands about 5 ft high and measures from tip to tip of its extended wings about 15 ft. With its almost bald head and neck and its pouch (sometimes 16 in. in length), which hangs like a dewlap from the lower part of its neck, the bird presents an uncouth appearance. It has a voracious appetite, no carrion or offal or putrescent matter apparently being distasteful to it.

Adler, Alfred (1870-1937), Austrian psychiatrist, b. Penzing, Vienna. He qualified in medicine at Vienna Univ. in 1895 and at first practised as an ophthalmologist, but later turned to mental disease. He was a prominent member of the psycho-analytical group round Freud. In 1907 he advanced his theory of organ inferiority (*Studie über Minderwertigkeit von Organen*). Four years later he seceded from the psycho-analysts and developed his 'individual psychology,' which emphasised the role of inherited bodily defects in determining mental structure. His doctrine is described in his *Über die nervösen Charaktere*, 1912 (Eng. trans. 1917), and in *Practice and Theory of Individual Psychology*, 1920. See life by H. Orgler, 1939, and Phyllis Boltome, *Alfred Adler, Apostle of Freedom*, 1946.

Adler, Nathan Marcus (1803-90), chief rabbi of the Jews of the Brit. Empire, b. Hanover, educ. at Göttingen, Erlangen, and Würzburg. He was chief rabbi at Oldenburg, 1829, at Hanover, 1830, and appointed to the chief rabbinate in London, 1844, in which capacity he did much to reunite the various Jewish congregations. Pub. sermons and other works, including one on the Pentateuch. He was succeeded in office by his son Hermann A. (1839-1911).

Adlington, William (fl. 16th cent.), Brit. author, known for his *Golden Asse of Lucius Apuleius* (1566). A. as a translator ranks with John Florio or Philemon Holland; yet nothing is known of him. Inasmuch as he dedicated his work to the Earl of Sussex from Univ. College, Oxford, it is evident that he was at Oxford, probably in a tutorial capacity. It is said by some that he was the 'W. A.' who in 1579 pub. a verse tract, *A Speciall Remedie against the Furious Force of Lawlesse Love*. See C. Whibley's introduction to the 1893 ed. of *The Golden Asse*.

Administration. Of the two functions of gov., legislation and A., the latter is by far the larger and more important, and in recognition of this fact the gov. of a country is often termed the A. or ministry. In modern constitutional states this A. must be in accordance with the law, and in this country, in addition to being responsible to the legislature, the ministers are as liable as ordinary persons for maladministration.

Administrative Counties are those cos. or parts of cos., including the co. of London and the co. bors., which, under the Local Gov. Acts, 1888-1933, form separate A. C. of themselves for the purpose of managing, through co. councils, the administrative business of their respective areas. Yorks and Lincs have 3 administrative H.Q. (excluding co. bors.), Suffolk and Sussex 2 each. See LOCAL GOVERNMENT.

Administrative Law has been defined by Sir Ivor Jennings, a leading contemporary constitutional lawyer, as 'the law relating to the Administration. It determines the organisation, powers, and duties of administrative authorities.' The ever-increasing activities of gov. depts, local authorities, and public corporations require lawyers to be familiar with administrative processes likely to affect the rights and obligations of their clients. Montesquieu in the 18th cent. mistakenly thought that the legislative, executive, and judicial functions in England were entirely separate. Broadly speaking it may be accurately stated that Parliament makes law; gov. depts, local authorities, and public corporations carry out the laws passed by Parliament; and the courts adjudicate disputes according to those laws. A merely superficial examination of the powers of the administration (q.v.) will reveal the obvious misconception of Montesquieu's doctrine of separation of powers. The administrative authorities have executive, legislative, and judicial functions. Their executive functions are to carry out the duties imposed on them by statute (e.g. the collection of taxes, the inspection of factories, and the administration of social services). They may also have legislative functions; a statute may empower a minister to make detailed regulations having the force of law, e.g. the Factories Act, 1937, authorises the Ministry of Labour to make safety regulations for specific industries. A minister may have to exercise judicial functions when adjudicating on the competing claims of interests likely to be affected by some administrative act. For instance, the Minister of Housing and Local Gov. may appoint an inspector to conduct a public inquiry into the making of a compulsory purchase order (see COMPULSORY ACQUISITION OF LAND). Disputes between claimants and the Ministry of National Insurance insurance officers about social service benefits administered by the ministry are adjudicated on by local tribunals appointed by the minister. The merits of claims for social service benefits or objections to ministerial orders confirming the compulsory acquisition of

land cannot be determined by the courts, whose jurisdiction is limited to questions of law. For instance, the court will not entertain an action which seeks to obtain a declaration that a compulsory purchase order inflicts undue hardship; it may, however, quash such an order on the grounds that it is defective in failing to comply with statutory requirements.

The prin. criticisms of the working of administrative tribunals are: (a) they are appointed by a minister whose dept has made the decisions on which they are required to adjudicate; (b) the jurisdiction of the ordinary courts in such matters is ousted. Appeals to administrative tribunals on such matters as compulsory purchase, unemployment benefit, or proposed increases of railway fares should be distinguished from the ordinary litigation in which gov. depts may be involved. Since the passing of the Crown Proceedings Act, 1947, gov. depts, like other public authorities, may be sued for breach of contract or negligence. Their administrative acts, unless made unlawfully, even if carried out harshly, are outside the scope of the courts. This has caused such grave concern that in 1955 the Gov. appointed a committee under the chairmanship of Sir Oliver Franks to inquire into administrative tribunals and inquiries. Its terms of reference are to consider and make recommendations on: (a) The constitution and working of tribunals, other than ordinary courts of law, constituted under any Act of Parliament by a minister of the Crown or for the purpose of a minister's functions; (b) The working of such administrative procedures as include the holding of an inquiry or hearing by or on behalf of a minister on an appeal or as the result of objections or representations, and in particular the procedure for the compulsory purchase of land.

See C. K. Allen, *Law and Orders*, 1945; G. L. Williams, *Crown Proceedings*, 1948; Sir A. Denning, *Freedom under the Law*, 1950; W. A. Robson, *Justice and the Administrative Law*, 1951; J. A. G. Griffith and H. Street, *Principles of Administrative Law*, 1952.

Administrator, person appointed by authority to dispose of or administer the estate of an intestate deceased, or of a deceased who has made a will but named no executor, or if an executor dies before the distribution of the property. Such a person is now appointed by the probate div. of the High Court, but prior to the creation of this court in 1858 an A. was appointed by the bishop of the diocese. Letters of administration are generally granted by the court to the next of kin, or in default a creditor may obtain them. An A. can charge upon the estate he administers his actual expenses but no more, and he is usually required to give some guarantee of faithful and competent administration. In all the Eng.-speaking provs. of Canada, the A. is allowed a commission—usually 5 per cent—on the amount of money passing through his hands. Letters of administration must be applied for within 6 months of the death of the

deceased, and a person performing the functions without this licence may be mulcted in £100 fine, plus an additional fine equal to 10 per cent of the value of the estate. The essential difference between an executor and an A. is that the latter can do nothing without the assent of the court appointing him.

Admiral, title of the chief naval officers and the equivalent in rank to a general on land; in fact, the 4 classes of A.s (A. of the Fleet, A., vice-A., and rear-A.) are equal in precedence with the 4 divs. of generals (field marshal, general, lieutenant-general, and major-general). The word is derived from the Arabic *amir* or *emir*, meaning a 'lord' or 'commander' (cf. *amir-al-bahr*, commander of the sea), and found its way into European tongues, like many others of E. origin, during the holy wars of the 12th and 13th cents. The office is, however, considerably older, and before the word became used in this country under Edward III, the chief naval officer was known as the 'guardian of the sea' (*custos maris*). The early Eng. form of the word was *amiral* or *ammiral*, the latter form being used by Milton, Cromwell's secretary of state. The present spelling of the word probably arose from the belief that it was an abridged form of *admirable*, or that it was a compound with the Lat. *ad*. The office of Lord High A., which subsisted with breaks from 1405, when it was created by Henry IV, till 1828, when its administrative functions were vested in the present Board of Admiralty, was of great importance and carried with it certain judicial functions, which, since 1875, have been exercised by the Probate, Divorce, and Admiralty Div. of the High Court (q.v.). The first Lord High A. was the Earl of Somerset, and from his time onward the duties were exercised by an individual until 1632, when for the first time the office was put into commission, all the great officers of state being commissioners. During the Commonwealth, naval affairs were at first directed by a parl. committee, but afterwards Cromwell himself took control of them. When Charles II was restored he appointed his brother James to be Lord High A., which office he retained till 1683, when Charles himself assumed it. On James's accession to the throne the next year he resumed his former office, but at the revolution of 1688 the office was again put into commission. In this position it remained until 1828 if we except the 3 years 1707-9, and the 16 months (1827-1828) when the 'sailor prince,' afterwards William IV, was Lord High A. Eng. A.s are divided into the classes above mentioned. They are known collectively as flag officers; the ships flying their flags are named 'flag ships.' Formerly the A.s of all grades were subdivided into A.s of the Red, of the White, and of the Blue Fleet, but this is now abolished, as is also, owing to the entire structural alteration in the form of war vessels, the old practice of an A. flying his flag at the main, the vice-A. at the fore, and the rear-A. at the mizzen masthead. See also ADMIRALTY.

'Admiral Graf Spee,' see NAVAL OPERATIONS IN SECOND WORLD WAR.

Admiralty, name given to the gov. dept administering the navy. Formerly responsibility for maritime affairs was entrusted to the Lord High Admiral, one of the great officers of state; but to-day his functions are discharged by 'Commissioners for executing the office of Lord High Admiral,' commonly called the Lords Commissioners of the A. The growth in importance of the A. has been accompanied by some shedding of its functions and privileges. Thus its judicial function, except in matters of naval discipline, has been transferred to other courts, notably the Probate, Divorce, and A. Court (q.v.), while the A. Droits (q.v.) are now collected by the Board of Trade and paid into the public exchequer. The executive authority remained with the political Lords Commissioners, but the administrative work was transacted by a subordinate board of technical officials called the Navy Board, consisting of the prin. officers of the navy. The Navy Board had been constituted by Henry VIII in 1546 from existing officials whose origin developed out of the office of keeper of the king's ships, first created by King John on the appointment of Wm of Wrotham, archdeacon of Taunton, in 1214. Samuel Pepys was one of the prin. officers of the navy from 1660 to 1673, holding the office of clerk of the acts, and wrote most of his famous diary in the old Navy Office.

The A., sometimes in commission, and at times held even by the king himself, had no permanent quarters till the reign of William III, when Wallingford House, the old residence of the Duke of Buckingham in Whitehall, was rebuilt and occupied in 1695. The office was again rebuilt 1723-5, from designs by Thomas Ripley, and the screen erected in 1760, from designs by Robert Adam. The old board room contains some fine carving and sev. historic items. With the expansion of business a separate residence was erected, 1786-91, for the First Lord, adjoining the A. office. Reorganisation in 1832 abolished the Navy Board, which since 1786 had occupied Somerset House; and in 1869-73 the staff there was transferred to Spring Gardens till an extension of the A. buildings should be built. The new building (erected 1891-1906) was extended in 1910 by the erection of the memorial arch across the Mall, which commemorates Queen Victoria. On the new buildings is erected the A. wireless station, by means of which direct communication with war vessels is maintained by H.Q. A large fortress-like bomb-proof extension, known as the citadel, was built in the Second World War as alternative accommodation for H.Q. staff and communications (see below). The last Lord High Admiral, 1827-8, was the Duke of Clarence, who afterwards became William IV. The members of the Board of A. are denominated lords commissioners. Formerly the whole board changed with the gov., but normally only the political members change

nowadays. The board is appointed by royal letters patent, and any change necessitates the issue of a fresh patent. The number of commissioners has varied with the amount of business, having reached 12 in 1918. To-day the prin. members of the board are: 1. **FIRST LORD OF THE A.**, who is a member of the Cabinet and a Privy Councillor, and resigns when the gov. does; he has the general direction and supervision of all business relating to the navy and controls all appointments to the higher posts. Personal responsibility for operations of war falls on the shoulders of the First Lord, because *ex officio* he is the chief naval adviser to the gov. 2. **FIRST SEA LORD AND CHIEF OF NAVAL STAFF** is an officer of the R.N. and deals with questions of naval policy and maritime warfare, is responsible for efficiency of the fleet, controls the work of the naval staff, and is a member of the Chief of Staff's Committee. 3. **SECOND SEA LORD AND CHIEF OF NAVAL PERSONNEL** is an officer of the R.N. and is responsible for the manning of the fleet, mobilisation, and medical arrangements and discipline. 4. **THIRD SEA LORD AND CONTROLLER** is an officer of the R.N. and is responsible for the provision of all kinds of material, including ships, machinery, guns, ordnance and stores; controls design, manuf. and maintenance, inventions, and research. 5. **FOURTH SEA LORD AND CHIEF OF SUPPLIES AND TRANSPORT** is an officer of the R.N. and is responsible for coaling, victualling, transport, pay and allowances, clothing, and medals. 6. **VICE CHIEF OF NAVAL STAFF** is an officer of the R.N. and is responsible for the collection of intelligence, co-operation with aircraft, land and wireless telegraphy; deals with questions of maritime international law. He acts as deputy for the First Sea Lord when necessary. 7. **PARLIAMENTARY AND FINANCIAL SECRETARY** (political; first included in the patent in 1929) is an M.P. and resigns his appointment when the gov. does; is in charge of all questions concerning finance, expenditure, estimates, accounts, and contracts. 8. **CIVIL LORD** (also political) is an M.P. and resigns when the gov. does; he superintends all works services, general labour questions, and schools. If the Civil Lord is a member of the House of Lords he deals with all A. questions in that House. The **PERMANENT SECRETARY** of the A. is also a lord commissioner of the A. He is a member of the civil service, is in charge of the secretariat, has financial control of the A., is accounting officer for navy votes, and is responsible for A. procedure, organisation, and discipline of the civil branches of the A. (Samuel Pepys, as stated above, held a similar post in the Navy Office, 1660-73.) The coast-guard service, which was formerly under the admiral-superintendent of naval services—called in more modern days 'Admiral Commanding Coast Guard and Reserves'—came to the A. in 1858, and in 1923 was transferred to the Board of Trade. The older part of the A.

contains some fine mahogany panelling and marine paintings by eminent artists. In the Ger. *blitz* on London the A. sustained 3 direct hits on the night of 16 April 1941, which damaged the fine old board room, and cut a great slice out of the S. front facing the Horse Guards Parade. The most serious consequence was the interruption of communications by the flooding of the basement. Hence was built the fortress-like extension at the corner of the Mall and St James's Park, a building which has the appearance of some oriental mud fort or citadel. Inside are some 150 rooms, air-conditioned and lit by daylight lamps, giving accommodation for the board and for everyone who might be needed for the world-wide control of the Brit. fleets while London is under attack. During the war naval ratings there ran a score of lines of direct high-speed transmission to naval wireless stations all over the world. There were also 80 girls in this fort working teleprinters to all the naval H.Q. in Britain and the Continent. The complexity of modern warfare is truly reflected in the naval communication system, and this citadel is veritably a maze of machinery and conveyor belts. In 1955 the A. buildings had a narrow escape when a complete block was burnt out. Fortunately this block was under reconstruction at the time and no naval records were lost. For details of U.S.A. see NAVY DEPARTMENT OF THE U.S.A.

Admiralty Court. The function of this court, formerly exercised by the Lord High Admiral, or by a judge holding a patent from him, is to try and to give judgment in maritime causes. Since the Judicature Acts of 1873 and 1875, which estab. the Probate, Divorce, and Admiralty Div. of the High Court, these functions have been discharged by 2 judges, who, in addition to giving judgment in probate and divorce matters, exercise the jurisdiction of the old A. C. Its duties are twofold, as an instance court and as a prize court, functions which in former days were discharged by 2 separate courts, albeit the judge of the instance court was usually appointed to preside over the prize court. In its capacity as a prize court the court has jurisdiction in matters of capture in port or on land if the capture has been effected by a naval force, or a mixed naval and military force. The court can also try any questions referred to it by the Privy Council concerning booty of war, i.e. property captured by land forces. As an instance court it originally dealt with both criminal and civil causes, but a series of statutes transferring the criminal side of its work to other courts has rendered this branch of its jurisdiction practically obsolete. When the Central Criminal Court was estab. in 1836, Admiralty criminal causes were transferred to it, and the Admiralty Offences Act, 1844, provided that in cases where Admiralty jurisdiction would have applied, they should be treated as if they were offences committed in the country where the offender was apprehended. The Naval

Discipline Act, 1866, transferred to naval courts martial the authority hitherto possessed by the A. C. in the matter of discipline in the navy. In civil cases again part of the work of the A. C. has been entrusted to the co. courts. The more important questions that the A. C. has to decide comprise those arising from disputes between part-owners of vessels, suits by seamen for wages, where not within the jurisdiction of other courts, cases of salvage, including Admiralty Droits (q.v.), and actions for damages arising out of collision of ships, etc. There is a separate A. C. for Ireland, but matters of prize are vested in the Eng. court. The court of Admiralty for Scotland was abolished in 1831, and its jurisdiction transferred to the ordinary courts—session, judiciary, and sheriff—and the maritime law of Scotland is the same as that of England. Courts of vice-Admiralty exist in many Brit. colonies. Appeals from the A. C. lie to the House of Lords, and from vice-A. C.s to the judicial committee of the Privy Council.

U.S.A. By the U.S. constitution, as interpreted by the U.S. Supreme Court, A. jurisdiction extends not only to the high seas but to the great lakes and rlys. connecting them and to all public navigable waters in the U.S.A. The states long ago delegated the jurisdiction of their old vice-A. C.s to the Federal Gov. This jurisdiction comprises all maritime contracts, torts, injuries, or offences. The Supreme Court has no original jurisdiction in Admiralty cases, all suits being in the first instance brought in the U.S. dist. courts. An appeal both on law and fact lies from the latter courts to the circuit court of appeals, and this appeal is final except in cases touching the jurisdiction of the court, the construction of a treaty, cases of prize, the constitutionality of a state or Federal law, and cases of infamous crime, when the right of appeal is direct to the Supreme Court. The A. C.s have jurisdiction also in cases of piracy and collision and over crimes and offences committed upon the sea within the administration and maritime jurisdiction of the U.S.A.

Admiralty Droits of. These are certain perquisites that formerly appertained to the Lord High Admiral, chief among them being the right to property of an enemy seized at the beginning of a war, and derelict ships at sea. In the case of the latter the finders of the abandoned vessel were entitled to nine-tenths of its value, the A. D. being the remainder.

Admiralty Island, large is., 1664 sq. m. in area, of SE. Alaska, in Alexander Archipelago S. of Juneau; 90 m. long, 35 m. wide, rises to height of 4639 ft. There are fishing and lumbering industries. It was discovered by Adm. George Vancouver about 1793.

Admiralty Islands, in the Pacific Ocean, form part of the Bismarck Archipelago (q.v.). Area 800 sq. m. The largest is about 50 m. long. Exports, copra and pearls. Discovered by the Dutch in 1616, they came under Ger. protection in 1885.

They were occupied by the Australian forces in 1914 and after the First World War were placed under Australian mandate. Seized by the Japanese in the Second World War, they were recaptured by the Allies in Mar. 1944. Pop. 15,000.

Admittance in an alternating current circuit is the inverse of impedance, or the ratio of current to voltage, measured in mho. A. is composed of conductance, G, and susceptance, B. G is the resistance/(impedance)², B is reactance/(impedance)². The numerical value (modulus) of A. is $Y = \sqrt{(G^2 + B^2)}$. In alternating current circuits the conductance is not, as in direct current circuits, simply the inverse of resistance. See ALTERNATING CURRENT; CELL, VOLTAIC; CIRCUIT, ELECTRIC.

Adobe, Sp. term for sun-dried bricks made from any substance which hardens in the sun; also used of the buildings made with the bricks. The material is widely used where the climate is hot and dry.

Adolphus, John (1768-1845), barrister and writer, b. London of Ger. extraction. His chief success as a pleader was in his defence of Thistlewood, the Cato Street conspirator, in 1820. He pub. a *History of England from the Accession of George III to the Conclusion of Peace in 1783*, 1802, also a *History of France from the year 1790 to the Peace at Amiens in 1802*, 1803. See *Recollections of the late J. Adolphus*, by his daughter, Emily Henderson, 1871.

Adolphus, John Leycester (1795-1862), barrister and writer, son of John A. (q.v.). He was called to the Bar in 1822, and became a co. court judge in 1852. His *Letters to Richard Heber, Esq.*, pub. anonymously in 1821, demonstrated that Sir Walter Scott was the author of the Waverley novels; his *Letters from Spain in 1856 and 1857* appeared in 1858. At the time of his death he was engaged in the completion of his father's *History of England*. See J. G. Lockhart, *Life of Sir Walter Scott*, 1837.

Adomnan, St., see ADAMNAN.

Adonai, see JEHOVAH.

Adonis, son of Cinyras and Myrrha, beloved of Aphrodite. When he was slain by a boar, Aphrodite sprinkled nectar on his blood and from it sprang the anemone. Persephone, queen of the shades, refused to give him up to Aphrodite. Zeus, however, settled the dispute by allowing him to spend one-third of the year with each goddess in turn, one-third being at his own disposal. A. appears in poetry as the type of masculine beauty. See also TAMMUZ. See Ovid, *Metamorphoses* x. 298-729, and Shakespeare, *Venus and Adonis*.

Adonis, in botany, genus of ann. and perennial herbs, family Ranunculaceae, natives of Europe and Asia. *A. vernalis*, perennial, has large, yellow spring flowers; *A. aestivalis* and *autumnalis* are annuals; *A. amurensis* has scarlet petals fancifully connected with the blood of the mythological hero; and *A. amurensis* is a Jap. perennial for the greenhouse.

Adoptianism, 2nd-cent. heretical doctrine which was revived in Spain at the

end of the 8th cent. Elipandus, Archbishop of Toledo, and Felix, Bishop of Urgel, declared that Christ in His divine nature was the Son of God by nature and generation; in His human nature He was the Son of God by adoption and grace. Charlemagne condemned the 2 bishops at the synods of Ratisbon in 792 and Frankfurt in 794; Felix recanted, but Elipandus adhered to his views. See C. W. F. Walch, *Historia Adoptianorum*, 1755; A. Harnack, *Grundriss der Dogmengeschichte*, 1889; R. L. Ottley, *Doctrine of the Incarnation*, 1896.

Adoption is a custom widely prevalent and legally regularised in many countries, both ancient and modern, though until recent legislation it had no place in Eng. law. Broadly the term is used for the act of taking a person into a family with the intention of conferring on that person the rights and duties of his new family. The theory of A. is generally traced to 2 motives: first, the desire to increase the strength of the family or clan, and second, to ensure, as in ancient Athens and modern India, the performance of sacred funeral rites. It follows naturally that where parental rights are strong A. assumes its greatest importance, and in ancient Rome, where the relationship of father and son was akin to that of master and slave, the law of A. played an important part. There were 2 forms of A. in Rome: one, by a fictitious or formal sale of the child by its natural parent before a magistrate, and two, by abrogation, i.e. by a vote of the people in the *comitia curiata*, or, at a later period, by imperial rescript. In the case of abrogation it was necessary for the person adopting to be *sui generis* (his own master). A woman, having no parental power (*patria potestas*) over her own children, could not adopt a child. Considerable changes were introduced by the *Institutes of Justinian*, chief among them being that parental authority did not pass to the adoptive father.

Previous to the Act of 1926, A. in the U.K. was no more than voluntary guardianship. Under that Act the proposed adoptive parent must not be under 25 years of age and must obtain the sanction of a court to the A. When legal sanction has been given, the natural parent loses all rights in the person adopted and the adoptive parent takes his place in all respects. The Adoption of Children (Regulation) Act, 1939, was aimed at abuses in connection with the informal A. of children; made it necessary that A. societies be registered with the local authority; and imposed restrictions on A. abroad.

Adour (Rom. *Atur*, *Aturis*, or *Aturus*), Fr. riv., rising in the Pyrenees, and flowing through the depts of Gers and Landes to the Bay of Biscay, near Bayonne. Length 180 in.

Adowa, cap. of Tigré, Ethiopia, is a well-built town 6000 ft above sea level with a pleasant climate. The Ethiopians here severely defeated the Italians under Gen. Baratieri on 1 Mar. 1896. In Oct. 1935 the Italians launched an air attack on A., and the town surrendered after a few days.

Adoxa Moschatellina, perennial herb, known as the moschatel or townhall clock, with greenish, yellow-anthered spring flowers, musk-like in scent; the one species of the one genus of Adoxaceae.

Adra, Sp. port in the prov. of Almería, on the Mediterranean. It has a coastal trade, and is near sugar plantations. The Phoenician tn, Abdera, stood close by. Pop. 10,500.

Adrano (anet **Hadranum**), tn in Sicily (q.v.), at the SW. foot of Mt Etna (q.v.), 16 m. NW. of Catania. It has fine churches, a 15th-17th-cent. monastery, and a 12th-cent. castle. It is an agric. centre. Pop. 26,400.

Adrar, Sp. N. Africa, see RIO DE ORO. **Adrastus**, King of Argos, a legendary Greek, waged war for Polyneices as one of the Seven against Thebes. A. alone escaped alive. When the Epigoni (q.v.) later destroyed Thebes, and the son of A. alone fell. A. d. of grief. See Herodotus, i. 41-5; 67-8.

Adrenaline, hormone secreted by the medulla of the suprarenal capsules (q.v.). It can be produced synthetically, and when injected has a vasopressor action, i.e. it constricts the blood-vessels. This vasopressor action is useful in treating haemorrhage and for temporarily raising a too low blood pressure. A. has a dilating effect on the bronchi, and is therefore effective in relieving the bronchial spasm associated with an attack of asthma. A. also mobilises the glycogen in the liver and thereby raises the blood sugar; for this reason it is seldom used in diabetic patients. Because of its vasoconstrictor properties it is used with caution in patients with arteriosclerosis.

Adrenocorticotrophin Hormone, see HORMONES AND PITUITARY.

Adria (anet **Hadria**, **Hatria**, or **Atria**), It. tn, in Veneto (q.v.), lying between the Po and the Adige (q.v.). It was founded by the Etruscans (see ETRURIA), and was once an important port on the Adriatic (q.v.). It is now 14 m. inland. A. has Etruscan and Rom. remains, and has a modern cathedral. There is a trade in agric. produce, flax, leather, and pottery. Pop. 14,000.

Adrian, see HADRIAN.

Adrian, name of 6 popes:

Adrian I (772-95). He received aid from Charlemagne during an invasion of his realms by the Lombards. Some dispute arose concerning image worship, without, however, disturbing the friendliness of the Frankish alliance. He d. before the dispute was settled.

Adrian II (867-72). During his occupation of the papal chair Bulgaria was reattached to the patriarchate of Constantinople. A. was forced by the Emperor Basil to agree.

Adrian III, who was Pope from 884 to 885, was succeeded by

Adrian IV, the only Englishman to occupy the Roman See. His name was Nicholas Breakspear, and he was b. about 1100 at Langley in Herts. His father was a priest of Bath, who abandoned his son, entering a monastery. Nicholas went to Paris and became a monk at St Rufus

near Arles. In 1137 he was elected abbot. He was summoned to appear before the Pope at Rome as a result of a conspiracy to overthrow him, because of a strongly developed disciplinary attitude towards his monks. At the inquiry he distinguished himself by his successful defence and moreover won approval from the Pope. In 1146 he was appointed cardinal-bishop, and in 1154 was elevated to the papal chair. He d. in 1159, after entering upon a long contest between the popes and the house of Hohenstaufen, which dynasty was finally overthrown long after A.'s death.

Adrian V became Pope in 1276 and d. in the same year.

Adrian VI (1522-3). His administration was actuated by a desire to sweep away all existing abuses, but met with much opposition.

Adrian, **Edgar Douglas**, 1st Baron **Adrian** (1889-), physiologist, educ. at Westminster School, Trinity College, Cambridge, and St Bartholomew's Hospital. M.D. Cambridge. F.R.C.P., fellow of Trinity College. He was elected fellow of the Royal Society, 1923, was President, 1950, and was awarded its Royal Medal, 1934, and Copley Medal, 1946. He was its Foulerton research prof., 1929-37; prof. of physiology, Cambridge Univ., 1937-51; Master of Trinity College since 1951. He pub. *The Basis of Sensation*, 1928, *The Mechanism of Nervous Action*, 1932, *The Physical Basis of Perception*, 1947, and papers on the physiology of the nervous system in the *Journal of Physiology*, *Brain*, etc. Jointly awarded Nobel prize for physiology (with Sherrington), 1932; appointed to Order of Merit, 1942. Awarded Baly Medal of Royal College of Physicians, 1929; gold medal of Royal Society of Medicine, 1950. He was created baron in 1955.

Adrian, city in Michigan, U.S.A., an agric., chrysanthemum-growing area 60 m. SW. of Detroit. It manufs. metal, paper products, wire fencing, etc., and is the seat of A. College, a Methodist school estab. in 1859, and Siena Heights College, a Catholic institution for girls. Pop. 18,400.

Adrian de Castello (c. 1460-c. 1521), scholar, statesman, and ecclesiastic, b. of humble parents in Tuscany. Pope Innocent VIII sent him to England in 1488, and he became Henry VII's agent at Rome. In 1502 he became Bishop of Hereford, in 1503 cardinal, created by Alexander VI, and in 1504 Bishop of Bath and Wells. In 1517 he was accused of complicity in the plot to poison Leo X. and stripped of all his offices in 1518. Cardinal Wolsey succeeding him at Bath. He fled to Venice, and is thought to have been murdered on his return journey to Rome at the death of Leo X. He wrote a poem entitled *Venatio*, 1505, and 2 treatises.

Adrianople, see EDIRNE.

Adriatic Question, The, the question of the control of the Adriatic, involving, more or less, all the 4 littoral states, Italy, Yugoslavia, Albania, and Greece. The question of the control of the

Dalmatian coast of the Adriatic, apart from the necessity for securing her N. frontier, was that which primarily determined Italy's policy towards the belligerents in the First World War. The whole future development of the country was involved in the solution of the problem of Italia Irredenta, and Italy's participation in the conflict was to be obtained only on consideration that an appreciable guarantee was afforded of redeeming peoples traditionally regarded as It. in sympathy and blood. In 1915 Italy signed with Great Britain and France the secret pact of London, by which it was agreed to give to Italy Trieste, Pola, and part of Dalmatia. It is not surprising in all the circumstances that the price demanded by Italy for her active intervention on the side of the Entente met with a formal protest from the Serbs against any such concession being made. The Adriatic littoral is almost exclusively populated by the Croats and Serbs, and the fact that the principle of the liberation and unification of the nations—one of the predominant factors in the European crisis of 1914—and in particular the Slav nation, would be violated by any such arrangement, was of itself enough to enlist against Italy the sympathies of the Russian Gov. In the result the Croatian and Slav claims were ignored and the alliance of Italy was purchased at the price asked by that power.

(See also Fiume; LONDON, PACT OF; TRIPLE ALLIANCE.)

The *Adriatic* considered strategically. Italy's own E. shore possesses no harbours suitable as naval bases for a modern squadron (except Taranto, which is outside the Adriatic). The opposite coast contains many of the finest natural harbours in the world, like Pola, Sebenico, Cattaro, Durazzo, Trieste—flanked for the most part with an amphitheatre of hills, capacious enough to accommodate a large fleet; and the whole Dalmatian coast is thickly studded with sheltering is. It was therefore from motives based on security, as well as imperialism, that Italy sought a greater measure of control over the Adriatic 1915-45. From the time Italy achieved nationhood in the 19th cent. It. politicians consistently held that until the equilibrium of the Adriatic—which in old It. documents is significantly spoken of as *il golfo di Venezia* and in modern times is popularly referred to as *il mare nostro*—could be restored, Italy would never be in a position of adequate security to act from the point of view of national independence. This doctrine unquestionably influenced It. statesmen at the time of Italy's intervention in the First World War, and throughout it lent to It. action much of its initiative, enthusiasm, and driving force. In 1939 Mussolini, by seizing Albania, secured virtually absolute control of the Adriatic. In the Second World War It. control was first weakened by the torpedoing of half the It. battle fleet at Taranto (11 Nov. 1940) by the R.A.F., and by the Brit. naval victory off Cape Matapan (28 Mar. 1941). Later the successful operations

of Tito in Yugoslavia further jeopardised It. control, which was lost entirely when the Anglo-Amer. armies invaded Italy. In any case the phenomenal development of aircraft rendered the strategical control of the Adriatic impossible without control of the air.

Under the terms of the It. peace treaty of 1947 Italy ceded to Yugoslavia nearly all Venezia Giulia prov., Zara, and the is. of Pelagosa; and to Albania (already freed by allied and Albanian guerrilla forces) Saseno Is. She also gave up the Free Ter. of Trieste. She thus lost her Adriatic foothold completely. In 1954, however, an Italo-Yugoslav pact, also joined by the U.S.A. and Britain (and tacitly approved by the Soviet Union), ceded the city of Trieste to Italy and the surrounding ter. (the Istrian Peninsula) to Yugoslavia, as it was by this time clear that the terms of the peace treaty concerning the Free Ter. could never be made workable. Trieste remains a free port, however.

Adriatic Sea, large arm of the Mediterranean, between Italy and the Balkan Peninsula, 450 m. in length. Its S. end is the strait of Otranto (q.v.). The N. coast is marshy, and has many lagoons. The E. coast is rocky and broken up, and has countless small, rocky is. On the W. the coast is generally low. The chief rivers flowing into the sea are the Po and the Adige (qq.v.); they carry down a great quantity of silt, and for this reason many tns once on the shore are now inland, e.g. Adria (q.v.), from which the sea may have derived its name. The chief ports are Venice, Brindisi, Trieste, Fiume, Ancona, and Bari (q.v.). The water is very salt, but is rich in fish. Area 52,220 sq. m.

See C. Yriarte, *Les Bords de l'Adriatique et le Monténégro*, 1878; F. H. Jackson, *Shores of the Adriatic*, 1908; R. W. Seton-Watson, *The Balkans, Italy, and the Adriatic*, 1916.

Adršpach (Ger. *Adersbach*), Czechoslovak vil. in the prov. of Hradec Králové (q.v.), 11 m. WNW. of Broumov. Near by are grotesque sandstone rocks, sev. m. in length. Pop. 650.

Adsorption, concentration of a solute in the surface layer of a solvent. Positive A. leads to an increased concentration, negative A. to a decreased value, the action depending on the nature of the solute and solvent and always tending to the lowest value of surface tension (q.v.). The large A. of gases by activated charcoal at low temps. is used to produce high vacua. See **ABSORPTION**.

Adulis, anc. name of Zula or Thulla, on the coast of Ethiopia, near Annesley Bay. It is interesting as the locality in which Cosmas, a Christian merchant, discovered the Gk inscription known as the *Monumentum Adulitanum*—really 2 inscriptions united, one referring to Ptolemy Euergetes (246-221 BC), the other to an unknown Ethiopian king. It also describes the subjugation of the Ethiopians. A. was destroyed by an earthquake in the 7th cent. AD. See H. F. Clinton, *Fasti Hellenici*, Pt II, 1824.

Adullamites, political term applied derisively to the Liberals who voted

against Gladstone's Reform Bill of 1866. Bright compared the seceders to the fugitives who hid with David in the cave of Adullam (1 Sam. xxii); Lord Elcho spoke of Gladstone as Saul, and Bright as the armour-bearer. The Cave is another name of the group.

Adult Education, term used to describe a great many educational activities for adults in a variety of institutions. In Britain the traditions of A. E. go back more than a hundred years. The Mechanics Institutes, the Polytechnics Univ. Extension lectures, the Workers' Educational Association, the Y.M.C.A., the trade unions, and the Co-operative movements were pioneers in the provision of classes and lecture courses for adults. Since then a great variety of agencies and institutions concerned with A. E. have developed. They include those run by voluntary societies and those financed by public money.

An intimate relationship grew up between the univs. and adult student groups. The position at the outbreak of the First World War was that the term A. E. was commonly used to denote the activities of the Univ. Extension movement and the Workers' Educational Association. However, many other bodies working among adults were co-operating in this work. The three-year tutorial classes were a result of this co-operation. By 1914 there were 130 of them, 10 years later 282. This aspect of A. E. is primarily concerned with 'liberal' studies. In April 1921 the Board of Education appointed a committee to promote the development of liberal education for adults, and in particular to bring together national organisations concerned with A. E. so as to secure mutual help and co-ordination. From 1924 under the new regulations the voluntary bodies were encouraged to make provision for more varied types of courses. There developed in consequence more elementary and pioneer forms of A. E. with such names as preparatory classes, one-year courses, and terminal courses (all under the new regulations), and evening classes for adults, study circles, and a multitude of other groups (these were not organised so as to conform with the regulations and had a free choice of title). The number and variety of classes at once showed a great increase. The maximum grant for a univ. tutorial class was raised. Univ. extension courses and preparatory classes, which previously had been aided under the regulations for technical schools at low rates, based on the number of students multiplied by the number of hours of attendance, were now brought under rigorous standards of attendance and written work and were given a much higher grant. Advanced tutorial classes, preparatory tutorial classes, one-year courses, and terminal courses attracted students in increasing numbers so that by 1938 there were over 56,000 adult students. Summer schools were developed steadily (the first being the Oxford Summer School in 1910); in addition to Ruskin College and Fircroft, four new

residential colleges were opened: Hillcroft (for women, 1920), the Catholic Workers' College (1921), Avoncroft (1925), and Coleg Harlech (1927). All these colleges now offer courses of not less than one year. Their number has been increased by the addition of the Co-operative College, Newbattle Abbey, and Woodbrooke College. A full list of the short-term colleges (of which there are 23) can be found in the National Institute of A. E.'s directory *Adult Education in the United Kingdom*. The subjects in the short-term colleges range even more widely than in the long-term colleges. For most courses they are open to all whether a student has previously attended an A. E. class or not. Many of these colleges are sponsored by local education authorities, who have made a growing contribution to A. E. since the First World War. They have themselves provided courses and experimented in new types of activities or have assisted voluntary bodies already working in the field. The London Co. Council took the lead in developing the work of their literary institutes. Less formal courses were provided in the men's and women's institutes. Cambs local education authorities pioneered the development of vil. colleges (1930). Considerable impetus also came from the National Federation of Women's Institutes which was founded during the First World War. By 1950 there were some 438,000 members of 7281 institutes providing craft and cultural subjects. In urb. areas the Towns-women's Guilds played a similar role.

A reorganisation of A. E. took place under the 1944 Education Act. A. E. comes under the third stage, called Further Education. Under the Act local education authorities were made responsible for securing the complete provision of educational facilities at the primary, secondary, and further stages. This included the securing for their area of adequate facilities for the full-time and part-time education of persons over compulsory school age, and for the leisure time-occupation of them in such organised cultural training and recreative activities as are suited to their requirements. These facilities were to be provided for any persons over compulsory school age who were able and willing to profit by them. The intention was to set up co. colleges as the focal point and corner-stone of all part-time education for young people under 18 years of age. They were to provide vocational training so that a good deal of evening study could be transferred to the day-time. But they were primarily intended to encourage leisure time interests and activities. Post-war economies prevented the development of this integral aspect of the 1944 Act. Nevertheless, local education authorities have encouraged voluntary participation and have themselves developed many A. E. programmes. The Ministry of Education bears a large proportion of the expenses: incurred (about 75 per cent for 'liberal' subjects); fees for courses are virtually nominal, the rest of the money being provided through local taxation by the

local authority or in some cases through univ. funds. Co-ordination of facilities between local education authorities and between technical colleges and industry is fostered by the 10 Regional Advisory Councils for Further Education in England and Wales. Financial support is given directly to organisations called 'responsible bodies.' They include the Extra-Mural depts of the univs. (21 in number), residential courses maintained or aided by local authorities, and various other colleges and organisations. Of these the Workers' Educational Association is the largest.

In addition to these 'liberal' studies a very great many professional or vocational courses are provided as part of A. E. 'Day Release' classes on one day a week for general subjects are provided for young workers under 18 in co-operation with their employers—they number some 375,000. About 1,900,000 students attend evening classes, whilst 402,000 are part-time day students and 63,000 are full-time. Of the total number of students attending A. E. classes nearly 90 per cent follow professional or vocational courses. The kind of institution varies from large comprehensive colleges (where all kinds of students are catered for by the provision of courses meeting both their leisure interests and occupational ambitions) to colleges where the courses are related primarily to the needs of particular local industries. There are art schools, polytechnics, literary institutes, working men's colleges, and technical and commercial institutes. The latter, as their names suggest, have a vocational bias but might also, in fact, serve as a centre of cultural life in the neighbourhood. Together these institutions offer a sufficiently wide range of courses to suit every taste.

A list of the central depts, local education authorities, univs. and univ. colleges, and other responsible bodies associated with A. E. is given in the National Institute of A. E.'s directory *Adult Education in the United Kingdom*. The address of the institute is 35 Queen Anne Street, London, W.1. Other associations include the Central Joint Advisory Committee on Tutorial Classes (38a St George's Road, Victoria, London, SW1); Civil Service Council for Further Education (Treasury Chambers, Great George Street, SW1); Delegacy for Extra-Mural Studies (Bewley House, Wellington Square, Oxford); Y.M.C.A.; Y.W.C.A.

Adult education in the U.S.A. has its origins in the evening schools founded by the Christian Churches and philanthropic persons during the middle decades of the 19th cent. Presumably whilst at first intended for younger children they attracted older students anxious to improve themselves. When the national system was fully developed for children the schools remained for adults. A stimulus was given to A. E. after the Civil War through public-spirited attempts to deal with new problems. The desire of the Methodist Episcopal Church to improve the education of its Sunday-school

teachers led to the formation of short settlements lasting a few days or weeks during the summer. The Chautauqua (q.v.) movement, as it is called, spread very rapidly through the U.S.A., and hundreds of summer schools came into existence. The Young Men's and Young Women's Christian Associations of America have been very active in promoting A. E. In the larger cities bodies like the Pratt Institute, the Cooper Union, and the administrators of the Peabody and Slater funds further assisted in the work. Correspondence colleges played a great part in bringing education to less populous dists. They are still run by both private and public univs. Perhaps the most significant development in the U.S.A. has been in the public school and univ. system. This has made A. E. as known in Britain almost unnecessary. All children attend school until 16 and many until 17 and 18 by law. Beyond High School there are many opportunities to attend two year Junior Colleges, or four-year Liberal Arts or Teachers' Colleges. Many types of course are offered at the Junior Colleges, which are often maintained by municipal authorities. They include vocational studies and courses leading to the second two years of the Liberal Arts course. Technical and professional training is highly developed in the institutions of higher learning, many of which are maintained and financed by the various states. Fees for in-state students are low, and opportunities exist for students to earn whilst they study. Nearly a quarter of the age range, in fact, attend some sort of college. There is a growing provision of A. E. at the community level. These programmes include guidance and advisory services on personal, occupational, health, and social problems. See U.N.E.S.C.O., *International Directory of Adult Education*.

Adulteration (Lat. *adulterare*, to defile or render impure), act of mixing with a commodity some inferior stuff, or abstracting some material of value, for the purpose of extra profit.

The practice of A. has been known from the earliest times. The merchants of the E. and of anc. Greece and Rome were in the habit of mixing inferior wines with good in order to enhance their own profit. Complaints of the roguery of brewers, bakers, and other tradesmen in England are met with as early as the reign of King John, and at the present time, despite all legislation, the A. of various kinds of food-stuffs is still practised. In earlier times the dishonest attempts of manufacturers were crude and fairly easy of detection, but in these days the adulterator has called chemical science to his aid, and so well is he able to counterfeits the genuine article that it is only by pitting against him the trained analyst that he can be brought to book. It is probable, fortunately, that the measures directed against A. are gradually taking effect, and, coupled with the greater desire of the consuming public for pure food, will do much to abolish a dangerous practice. It may at once be admitted

that the fault is not all on the side of the vendor of the adulterated articles. His excuses are, no doubt, often specious, but the average customer demands an attractive appearance in the goods he buys, which can only be obtained by the addition of colouring matter. So much may be said for the difficulties of the tradesman, but when he protests that certain added materials are quite harmless, that they improve the flavour, or that the market price forbids a pure article, in the interests of the public health he should be repressed. Many adulterants may not be actively injurious and yet may do a great injustice to poor and ignorant people. They expect certain qualities in their food, and are defrauded if that standard is not reached. The practice of adulterating milk with water does not lead to poisoning, but it often means insufficient nourishment for the infants of poor parents.

Various Acts have been passed relating to the A. of food and drugs, the earliest ones being those of 1875, 1887, 1899, and 1938. The most recent is the Food and Drugs Act of 1955, which consolidates with amendments all the previous Acts. Under this Act the Minister of Agriculture, Fisheries, and Food and the Minister of Health are given powers to require from manufacturers information about the substances they use in the manu. of food and to control processes which might be injurious to health. The older Acts had already laid it down that food and drugs must not be mixed, coloured, stained, or powdered with any material injurious to health. No person is liable to conviction if he can show that he did not know of the A., and that he could not by the exercise of reasonable diligence have ascertained the fact. No person may sell to the prejudice of the purchaser any article of food or any drug not of the nature, substance, or quality demanded. It is not, however, illegal to add any ingredient not injurious to health, if required for the preparation of the food or drug as an article of commerce, provided the ingredient is not added fraudulently to increase the bulk or weight, or to conceal any inferiority in quality. Ingredients which are not of an injurious or a fraudulent character may also be added if the article is labelled to the effect that it is mixed. A person guilty of any offence is in effect liable to a fine not exceeding £100 or imprisonment for three months or both.

Many common food articles have been adulterated. For example, wheat flour can be adulterated with flour made from maize or rice, butter with margarine, milk with borax or soda as preservatives, jam with vegetable pulp, coffee with chicory, and cocoa with sago flour. Various Acts of Parliament have been passed to stop A., and inspectors are appointed by the co. and bor. councils to visit shops and examine the articles sold. An inspector can buy a sample of anything he thinks is adulterated and have it analysed. If the analyst finds it is adulterated the offender can be heavily fined.

All the states of the U.S.A. have passed laws for securing the purity and cleanliness of food. Most of these state laws adopt the general principles to be found in the Federal law as enacted in the Federal Food and Drugs Act, 1906, and amending Acts. This Act gives the Federal Gov. jurisdiction over all food intended for commerce, whether for foreign countries or as between state and state; but each of the states has control over all the food produced and consumed within its own borders. The above Act provides that food shall be free from injurious ingredients, etc., and that packages shall clearly state the quantity of the contents. It also provides two remedies for infringement, namely criminal prosecution and seizure of the goods, and both may be exercised concurrently. The purity or freedom from adulterants of such important foods as meat and tea is safeguarded by special Acts, empowering inspection by the Federal authorities. Tea shipments for entry into the U.S.A. are inspected in order to secure that the tea conforms as to quality to the standard laid down by the Secretary of Agriculture; while under the Meat Inspection Act all animals intended for slaughter, all carcasses for food, and all meat for canning, curing, etc., is examined, the inspection thus beginning with the live animal and ending only when the finished product leaves for consignment, whether from state to state or to a foreign buyer.

Adultery means sexual intercourse between a married person and someone not his or her spouse. In ancient legal codes it was, in theory at any rate, harshly punished, in many cases the death penalty being prescribed. Some modern states still regard A. as a crime, and treat it as such, some of the states in the U.S.A., until recently, punishing it by fine or imprisonment. In England A. is subject to no penalty other than social ostracism, but is ground for a civil action for damages and for divorce. Formerly only the husband could petition for divorce on the sole ground of A., a wife's petition requiring some additional ground, such as desertion or cruelty, but since the passing of the Matrimonial Causes Act, 1923, both sexes are on an equal footing in this respect. A petitioner who also has committed A. must seek the court's discretion, otherwise his (or her) petition will fail. *See also* DIVORCE.

Advancement, legal term for money advanced to a minor or other beneficiary under a will or settlement with a view to the A. or benefit of that person. A common form of A. is that of finding the capital for setting a person up in business, but money expended on education or apprenticeship is not technically considered A.

Advent (Lat. *adventus*, coming), season of 4 weeks preceding Christmas observed as a preparation for the festival of the nativity of Christ. Formerly A. was kept almost as strictly as Lent, public amusements and festivities being prohibited, and fasts observed. The first Sunday in A., commonly called A. Sunday,

is the Sunday, whether before or after, which falls nearest to St. Andrew's Day (30 Nov.); and since the 6th cent. it has been the start of the eccles. year, except in the Orthodox Church, where it begins on St. Martin's Day (11 Nov.). See also ESCHATOLOGY and MILLENNIUM.

Adventists (Lat. *adventus*, coming), or Second A., collective name of six groups of religious sects in America: the Evangelical A., Advent Christians, Life and Advent Union, Age-to-Come A., Seventh-Day A., and Church of God. They are Protestant evangelical groups which grew out of the worldwide discussion of the second advent of Christ in the early decades of the 19th cent. At that time godly scholars in many lands and of many denominations were led simultaneously to the conclusion, from their study of Bible prophecy, that the coming of Christ was near. In America Wm Miller stirred the country with the message that Christ would come in 1844. When the advent did not take place at the time specified the advent teaching was widely ridiculed, but a restudy of the prophecies for clearer light convinced many sincere believers that while they were mistaken as to the nature of the prophetic period terminating in 1844, the 'signs' of the approaching advent were multiplying in the earth, and they set themselves to look for and proclaim the 'blessed hope' of the second coming of Christ as the only solution of earth's ills.

The most active of the groups stemming from the advent revival is the *Seventh-Day A. church* (1844), which, as the name implies, observes the seventh day of the fourth commandment (Saturday) as the true Sabbath. Its members now number more than a million baptised believers around the globe. Evangelistic, medical, educational, and publishing activities are conducted in 722 languages and dialects. Other A. groups include the *Evangelical A.* (1845), who believe in the resurrection of the soul, that the just will reign with Christ through the millennium, and the unjust shall be tortured in hell for ever. The *Advent Christians* (1861) hold that at the second coming the just will receive immortality, the unjust annihilation. The *Church of God* (1864-5) resembles the Seventh-Day A. Church in all respects but in the application of the two-horned beast to the U.S.A., and in the acceptance of Mrs. Ellen J. White's writings as inspired. The *Life and Advent Union* (1860) believe that the wicked will remain asleep throughout eternity, while the good shall obtain everlasting life. The *Age-to-Come A.* (1851) maintain that eternal life is gained only through Christ. There are in the U.S.A. 30,000 church members of the Advent Christian Church and 285,000 members of the Seventh-Day A. See J. G. Wellcome, *History of the Second Advent Message*, 1874; D. T. Taylor, *The Reign of Christ*, 1889; L. E. Froom, *Prophetic Faith of Our Fathers* (4 vols.), 1955.

Adventure Bay, in Bruny Is., off the SE. coast of Tasmania, was discovered by Capt. Furneaux in 1773, and named after

his ship, the *Adventure*, which was later used by Capt. Cook on his visit to the bay in 1777. See Capt. J. Cook's *Third Voyage* (vol. 1), 1784, and W. Bligh's *Voyage to the South Seas*, 1792.

Adverb (Lat. *adverbium*, from *ad*, to; *verbum*, word, verb), name of one of the parts of speech used with verbs, adjectives, or other A.s to qualify their meaning, just as the adjective is used with substantives; e.g. in 'He sings well,' 'well' is the A. qualifying the verb 'sings'; and in 'an extremely delicate child,' 'extremely' is the A. qualifying the adjective 'delicate.'

Advertisement. A.s. in the legal sense of proclamations, decrees, or announcements of events, date at least to Roman times, when placards were commonly fixed to pillars in city forums or public buildings. In the more restricted modern definition of offers for sale of goods or services, A.s. appear able to claim at least as great antiquity. There is, for instance, some ground for belief that an enterprising Carthaginian of 500 BC would advise merchants of the arrival of one of his ships by sending round the business quarter slaves wearing shirts bearing the ship's name and a description of its cargo.

Until well into the Middle Ages there was little advertising, and indeed there was little need for it. Wants were few and simple and they were satisfied from the resources of the vil. or tn, supplemented by occasional visits from tinkers and packmen. Since few but priests could read and write, notices of forthcoming events and of produce for sale would have been of little use. Everyone knew what everyone else did and where he lived, and a sign on a house to symbolise a trade was sufficient guidance for strangers.

In Elizabethan times the wider spread of learning, together with foreign wars and voyages of exploration, encouraged the development of news sheets. In the *Mercurius Britannicus* of 1 Feb. 1625 there appeared one of the first Eng. A.s known to have been carried by a periodical: 'Here is this present day published an excellent Discourse concerning the Match between our most Gracious and Mightie Prince Charles, Prince of Wales, and the Lady Henrette Maria, daughter to Henry the Fourth, late King of France, etc., sister to Lewis the thirteenth, now King of those Dominions; Manifesting the Royal Ancestors of both these famous Princes, and truly explaining the severall interchanges of Marriages which hath been betwene France and England: with the Lively Picture of the Prince and the Lady cut in Brasse.'

During the Civil war news sheets multiplied and many carried publishers' A.s. Announcements of books by Milton and of Izaak Walton's *Compleat Angler*, for instance, were pub. in the *Mercurius Politicus*. The same jour. carried on 30 Sept. 1658 this interesting announcement: 'That Excellent, and by all Physicians approved, China drink,

called by the Chinese *Tcha*, by other nations *Tay* alias *Tee*, is sold at the Sultaness Head Cophee-House, in Sweeting's Rents, by the Royal Exchange, London.

During the next 50 years numerous periodicals saw the light of day, although in some cases not for long. Authority—not for the first time—sought to limit the activities of the press, and in 1712 a heavy stamp duty was imposed on each copy of a pub., and a tax of 1s. was charged on each A., if it were no larger than one line of type. With others Steele's *Spectator*, which had first appeared in the previous year, found the burdens too great. A little earlier, on 14 Sept. 1710, Addison had written in the *Tatler*: 'The third and last use of these writings is to inform the world where they may be furnished with almost every thing that is necessary for life. If a man has Pains in his Head, Chollic in his Bowels, or Spots on his Cloathes he may here meet with proper Cures and Remedies. If a man would recover a Wife or a Horse that is stolen or stray'd, if he wants new Sermons, Electurates, Asses' Milk, or anything else, either for his Body or his Mind, this is the Place to look for them in.' Describing some of the favoured attention-getting devices, he said: 'Asterisks and Hands were formerly of great Use for this Purpose. Of late Years, the N.B. has been much in Fashion; as also were Cuts and Figures, the invention of which we must ascribe to the Author of Spring Trusses. I must not here omit the blind Italian character, which being scarce legible always fixes and detains the eye and gives the curious reader something like the satisfaction of prying in a secret.'

Addison exaggerated a little in suggesting that the A.s of his time had universal appeal. The periodicals and news sheets and the daily newspapers, when they made their appearance—the *Daily Courant* in 1702 was the first of these—were read in the main in the coffee houses. The patrons of these estabds. had the time to read and discuss the news. They were not typical of the pop. as a whole and newspaper A.s likely to appeal to them would cover only a restricted field of interest. The 'Cuts and Figures' that Addison mentioned were wood-cuts of, for example, a ship with all sails set to distinguish announcements of sailing dates and destinations. A.s for missing slaves and apprentices were sometimes marked off by a wood-cut of a running man looking over his shoulder. This adventure in illustration did not last for long. So many advertisers wished to have their A.s decorated in this way that the continued repetition of the same illustration on a newspaper page defeated its purpose, and wasted a great deal of space. The newspapers placed an embargo on illustrations, which lasted for nearly 200 years.

With the arrival of the Industrial Revolution the need for advertising became evident. The vil. artisan had made, for example, 1 cooking pot a

day. The first factories, primitive though they were, could turn out perhaps 10 articles for each man they employed. By using their machinery to full capacity, it might be possible to produce 20 a day per man and show a still greater reduction in price. But where the vil. artisan had easily sold his 1 pot a day in the immediate neighbourhood, a wider market was needed for the output of the factory. Instead of the customers going to the workmen, the manufacturer had to go to find his customers. This situation led to a further div. of labour, for it soon became impossible for a factory owner to manage his factory and make the increasingly long selling journeys that were necessary. Salesmen were engaged. At first, like the earlier packmen, they would sell their goods from house to house, but it became evident that it was more economical to dispose of two dozen pots to the vil. blacksmith than to sell one to each of 24 housewives, and the retailer entered the picture. By logical extension of this process, a dealer might buy in two-gross or three-gross lots, and re-sell two dozen at a time to 10 or 12 retailers throughout a county, so becoming a wholesaler.

This development had advantages for the manufacturer, but there were drawbacks as well. He was no longer in touch with the final consumer. Wholesalers and retailers were interested in buying as cheaply and selling as dearly as they could and would play off one manufacturer against another to get the lowest possible price for a quality just good enough for the customer to accept. To the responsible manufacturer this was an unsatisfactory state of affairs, since even if his product gave satisfaction to the consumer, there was no certainty that it could be bought a second time. So to protect their business manufacturers began to brand their goods, placing their names or marks on each article so that it could be identified, and if it had proved satisfactory it could be asked for again. Some products such as sugar, dried fruit, and treacle had first to be put in packs, boxes, or tins before they could be branded, and this packaging not only identified the product, but gave a guarantee of weight or volume as well as delivering it in a more hygienic state.

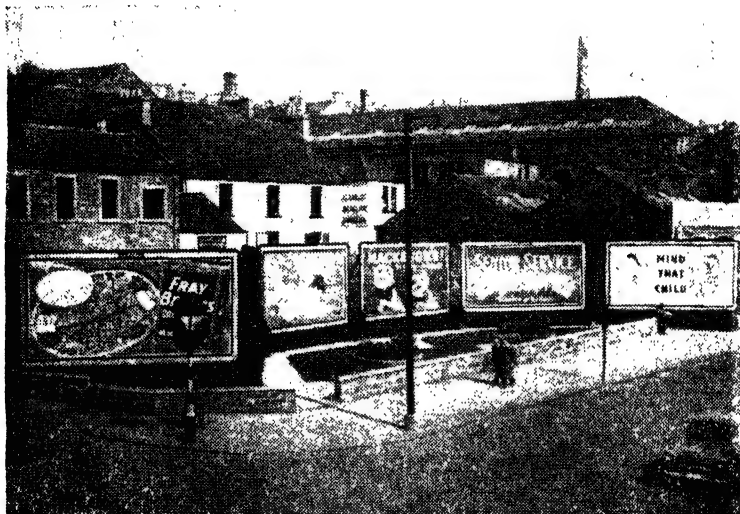
But no one can buy a product if he does not know that it exists. People had to be told. The manufacturer, having perforce taken over the retailer's original function of choosing appropriate goods, warranting their quality and value and selling them in small quantities, was compelled to take the further step of telling the consumer public about his product.

The favoured method was, at first, the newspapers, although the A. tax and the ban on illustration were handicaps. About 1740 the first posters or bills appeared, and with the advent in 1850 of the Penny Post, what is now known as direct mail began to be used. But the greatest increase in A. dated from 1853, when the A. tax was abolished, to be

followed in 1855 by the newspaper stamp duty, and in 1861 by the duty on paper. In 1855 there were some 640 newspapers in Britain; by the end of the century there were more than 3000. By that time the illustrated weeklies had begun to allow 'picture blocks' in A.s, and in 1892 a map illustrating a railway prospectus appeared in the pages of *The Times*. Higher standards of education and almost universal literacy encouraged the launching of newspapers and magazines and the use of new methods of attracting readers to both the editorial content and the A. column. Halfpenny postage

greater impact than some of the older media, and there is evidence that when efficiently handled it will produce immediate results—and at a reasonable cost. It has been estimated that in 1956 a total of £9½ to £10 million was spent for advertising time on television.

Figures issued by the Advertising Association gave the estimated total cost of advertising in Great Britain in the year 1955 as just under £300 million, or less than 2 per cent of the national income, or 5d. in every £ of a consumer's expenditure, or about half of the tax on tobacco collected by the Chancellor of



The General Poster and Publicity Co. Ltd

A 'GARDEN' ADVERTISING SITE IN DUNDEE

for printed papers, introduced in 1880, greatly stimulated the distribution of leaflets and circulars through the mail. The other estab. media, such as posters, signs, car cards, booklets, display, exhibitions, and sampling, shared in the general activity which continued at an increasing pace only temporarily halted during the world wars and the depression years of 1930-1.

Commercial radio came into being in the late twenties when, in 1925, the first sponsored radio A. was broadcast from the Eiffel Tower. Radio stations, totaling 7 in 1939, were set up in Franco, Luxembourg, and S. Ireland, to broadcast programmes in English sponsored by advertisers. Of these 7 only Luxembourg now operates. On 22 Sept. 1955 the first commercial television station was opened in London (see INDEPENDENT TELEVISION AUTHORITY). By combining sound, vision, and movement, commercial television advertising has a

the Exchequer. It was made up, approximately, in this way:

Press	(£000)
National newspapers	40,500
Prov. newspapers	62,000
Magazines, periodicals	37,500
Trade, technical journals	32,000
Other pubs.	1,500
Production costs	9,500
	<hr/> 183,000
Posters, transportation	16,000
Outdoor signs	7,500
Radio	1,000
Films, slides	4,000
Catalogues, leaflets	28,000
Window, interior display	18,000
Exhibitions	12,500
Free samples, gift schemes	5,500
Miscellaneous	4,500
Administration	13,000
	<hr/> 293,000

About seven-tenths of the total sum represented advertising directed to the consumer; the remainder included advertising of components or semi-finished products to other manufacturers, financial advertising, company meetings, reports, and classified A.S. Advertising represents not far short of half of the revenue of the press, so that without it a daily newspaper might cost twice as much as it does.

Advertising in the United States began in much the same way as in Great Britain. Development was more rapid, and many of the innovations and improvements in techniques in the last 50 years were pioneered by Amer. organisations and individuals. The size of the N. Amer. continent prevents nation-wide distribution of daily newspapers, which are confined by the limitations on rapid transport to comparatively small circulations and circulation areas. The local character of newspapers offers an advantage to the advertiser who wishes to concentrate on one or more well-defined geographical areas. To advertise nationally he may use the weekly or monthly magazines, which offer the additional appeal of high-quality colour printing, and business or trade periodicals and farm magazines. Radio and television stations, which, with the exception of certain public-service foundations, draw their revenue from the sale of advertising time, offer the advertiser the opportunity to place his product or service before a single community in a spot or local campaign, or to cover the majority of the pop. through one or more of the networks. Outdoor, cinema, and direct mail advertising, which have been developed perhaps to a greater degree than in any other country, are equally flexible instruments.

Expenditures by manufacturers who require to cover the whole of the U.S.A. are inevitably heavy. General Motors spent in newspapers and magazines, business and farm papers, network radio and television a total of 121 million dollars in 1955. It has been estimated that the total spent on advertising in the U.S.A. rose almost continuously from 50 million dollars in 1867 to 9982 million in 1956, and in 1957 it is expected to reach 10,500 million dollars. Amer. advertising men were the first to develop research, replacing assumption by scientific inquiry into products, media, people, and the factors influencing their buying decisions. They were also the first to recognise that advertising and selling were not distinct activities, but part of the marketing process that covers the chain of events from the design and packaging of the product through to its delivery to the final consumer. *See also* ADVERTISING AGENCIES; ADVERTISING RESEARCH; MARKET RESEARCH.

See Amer. Marketing Society, *The Technique of Marketing Research*, 1937; R. P. Hyman and L. Sharpe, *Technique and Practice of Advertising Art*, 1939; E. A. Lever, *Advertising and Economic Theory*, 1947; Market Information Services, *The Size and Nature of the Poster*

Audience, 1949, 1955; R. Manvell, *Modern Radio Advertising*, 1949, *Television Writing*, 1952, *The Animated Film*, 1954; H. Whitehead, *The Administration of Marketing and Selling*, 1950; P. W. Burton, B. Kreer, and J. B. Gray, *Advertising Copywriting*, 1950; A. F. Osborn, *Applied Imagination*, 1953; T. Eckersley, *Poster Design*, 1954; Advertising Research Foundation, *Motivation Research*, 1954; J. W. W. Cassels, *How to Sell Successfully by Direct Mail*, 1954; M. Maddan, *Profitable Export Marketing*, 1955; R. Barton, *Advertising Agency Operations and Management*, 1955; Brit. Market Research Bureau, *Reading in Market Research*, 1956; H. W. Hepner, *Modern Advertising—Practices and Principles*, 1956; J. W. Hobson, *The Selection of Advertising Media*, 1956.

Advertising Agencies. At the beginning of the 19th cent. it had become usual for advertisements intended for newspapers pub. in London to be accepted at 2 or 3 shops dispersed about the city, to save advertisers the trouble of making a journey to the newspaper offices. In time, as manufacturers began to advertise, the practice grew up of allowing a commission, usually 10 per cent, to those who brought a newspaper an order for space. Since rates were elastic, it soon became evident that a man could make a profit by buying space in bulk—say a whole page at a time—striking the best bargain he could with the newspaper, and selling the space in smaller sizes to a number of manufacturers. But a seller of space in one newspaper might cultivate a particular advertiser over a period, only to lose the order to a rival who was on the spot when the advertiser made his decision. The remedy for this state of affairs was to buy space in a number of newspapers and offer the advertiser a choice. The space seller, in effect, became a space broker. Later still the practice of buying space in advance was abandoned. The advertising agent, as he was becoming, advised the advertiser as to which media to use and only then placed the orders.

The first A. A. set up business in London in the early years of the 19th cent., and sev. are still in existence. But the last 100 years have seen fundamental changes in the agency's functions, some caused by competition, others by Amer. example. From advising on the media to use and buying the necessary space, the agent advanced to giving advice on how to fill it. He would write the 'copy' or text matter, and when illustration began to be allowed would make drawings and order engravings. Within the last 20 years still greater changes have taken place.

The description 'agent' is no longer correct in the legal sense, for the advertising practitioner is a principal who is himself responsible for the commitments he makes on behalf of his clients. It has come to be realised that to buy space and provide copy and illustrations is no longer enough; for advertising to be efficient it must be closely co-ordinated.

not only with the manufacturer's selling operations, but with his production planning. The modern service advertising agency includes departments to handle research, copywriting, typesetting, the planning and buying of display material and literature, the production of illustrations and photo-engraving, media planning, the buying of space in newspapers and magazines and on hoardings, the buying of time and the production of advertising in the cinema, on radio, and on television, the planning of packaging and display, marketing and merchandising, public and press relations, and the production and placing of overseas advertising and publicity in any medium available in the territories to be covered. Because of the variety of products and services handled by the large agency, it can give a client the benefit of specialised skills and a wider experience than he could provide from his own resources.

A. A. have their own organisation. As long ago as 1917 the Association of British Advertising Agents was formed. In 1927 the name was changed to the Institute of Incorporated Practitioners in Advertising, and membership became available not only to recognised agencies, but to qualified members on their staffs. To gain corporate membership as a Registered or Incorporated Practitioner an agency must: (a) be equipped to provide full advertising service and marketing advice; (b) include among its personnel fellows or members of the Institute; (c) be free from any vested interest in advertising media or other facilities; (d) pledge itself to observe the Institute's standards of practice.

Many retailers concerned only with local advertising do not use the services of an agency. In 1952 it was estimated that in that year almost one-half of the expenditure on advertising in Great Britain was placed by recognised A. A. In such media as national newspapers, magazines, and radio the proportion was very much greater.

Advertising Agencies in the U.S.A. John L. Hooper is credited with establishing the first American advertising agency in the early 1840's. In 1864 there was founded the firm of Carlton & Smith, which was taken over by James Walter Thompson in 1878. In 1916, with a turnover of 3 million dollars, Thompson sold out, believing that no further expansion was possible. But growth continued. A London office was opened in 1922; by 1933 J. Walter Thompson was recognised as the world's largest advertising agency; and in 1955, with 34 overseas branches, its annual turnover was calculated at 220 million dollars.

See also ADVERTISEMENT.

Advertising Research. In the early years of this century, Sir Arthur Bowley and Seebohm Rowntree, in their inquiries into the incidence of poverty, used methods which were later to be adopted for A. R. After analysing the problem and selecting representative samples of the population to be studied—in the case of the Rowntree inquiries the urban poor—

questionnaires were designed to bring out all the apparently relevant facts by simple answers at personal interviews. The answers were then grouped, analysed, and examined to determine what conclusions could be drawn and how valid these conclusions would be of the whole field under study. About the same time, advertisers began to show impatience with the secretive attitude adopted by newspapers and periodicals, who considered that the number of copies they sold was nobody else's business. The Advertisers' Protection Society campaigned for the publication of sales figures, and where these were not forthcoming provided estimates for their members. Soon after the First World War the society changed its name to the Incorporated Society of British Advertisers, which, in 1931, was mainly responsible for setting up the Audit Bureau of Circulations; the bureau provides, twice a year, the net sales figures of member publishers—of whom there were over 600 at the end of 1956, together with 257 advertisers and 211 agencies.

The first independent attempt in Great Britain to go beyond figures of sales was made early in 1932, when Topford Ltd. published *Investigative Press Circulations*, a report on 53,931 interviews throughout the country to determine family reading of a list of periodicals and daily and Sunday newspapers. The results were analysed by 3 income groups and 16 areas. In 1936 Sales Research Services Ltd. carried out for the Incorporated Society of British Advertisers 82,613 interviews covering a similar field. The results, analysed by 5 income groups and 10 areas, were published as *The Readership of Newspapers and Periodicals*. The title would not be considered accurate to-day, since the survey was in effect a breakdown of net sales and not circulations.

Readership—that is to say the total number of adults reading a given issue of a newspaper or periodical—was first investigated in 1939, when the Institute of Incorporated Practitioners in Advertising commissioned a large-scale survey. After the war, interest in media research continued to increase, and improvements in statistical method and sampling technique allowed the use of smaller numbers of interviews and therefore reduced costs. The year 1947 saw the appearance of 3 surveys, one by Attwood (Statistics) Ltd. using a sample of 20,000; the Hulton Readership Survey, which gave additional analyses by age group, domestic status, and special interest sections; and the Survey of Press Readership commissioned by the Institute of Incorporated Practitioners in Advertising. The Hulton Survey was carried out annually for 10 years, the last being issued in 1956. Hulton also distributed in 1947 surveys into the reading by retailers in 10 trades of newspapers, periodicals, and trade papers, and in 1948 issued a study of the relative attention value of different sizes of press advertisements. The Institute issued further readership surveys in 1954 and 1956—the latter intended to

be part of a comprehensive, long-term investigation.

In planning media schedules, it has become the practice to use readership data, because so many consumer goods appeal to women rather than men, or to one age or class group more than to others. A baby product, for example, will be of interest to mothers of children under 5, and it is only from the pub. readership surveys that one can find how many of this category are reached by different pubs.

Within the last few years it has been possible to get a more precise picture of the degree to which the desired sections of the pop. are reached. This cannot be achieved by adding together the percentages for individual pubs., since many people read 2 or more newspapers or magazines, so that there is duplication or overlap. To deal with this a schedule assessment service is available, using the cards that are punched for all of the informants in one or the other of the national readership surveys; these can be mechanically sorted to isolate attributes, such as housewives with children, home owners, or cigarette smokers. They can be sorted again to eliminate those who read any specified combination of newspapers or magazines. In this way it can be found how many of the desired group will be reached by, say, 3 national dailies, and how many new readers will be gained by adding any one or all of the remaining nationals, and further by using single magazines or groups of magazines as well. Problems of sample size have so far prevented all but a few of the most important prov. papers from being included in national readership surveys. Sev. newspaper groups have provided detailed studies of their readership or circulation at their own expense.

Posters and other outdoor advertising media have had attention too. Examination of the patterns of regular journeys within tns, and into tns from their hinterlands, has made it possible to devise a formula which gives the numbers of sites required for varying degrees of coverage and repetition. In Greater London figures of traffic density at various points of London Transport's system and at different hours of the day give an indication of the opportunities to see station posters, car cards, and bus bills.

The cinema industry was unwilling for a very long time to pub. details of its activities. Until the war the only authoritative study was *A Statistical Survey of the Cinema Industry in Great Britain in 1934*, and in July 1944 the committee reporting on *Tendencies to Monopoly in the Cinematograph Film Industry* said: 'It is regrettable that as soon as we attempted to pursue our investigations any distance into the realm of detail we found ourselves groping in conditions of statistical twilight.' Matters have improved in the last few years with the pub. by the Board of Trade of quarterly averages of attendance figures, analysed by geographical areas and seating capacity. As a result,

charges for advertising films have recently been revised downwards.

The period of the last 30 years has covered the introduction to this country of 2 new media—commercial radio, which began in 1925, and commercial television, whose début was made in London on 22 Sept. 1935. A *Survey of Listening to Sponsored Radio Programmes* was made in 1938, analysing listening to 5 continental stations and also to the B.B.C. programmes. The next to be pub. was in Jan. 1949, and further reports have appeared at intervals, giving details of listening by times, age and class groupings, and regions. Commercial television suffers from no lack of statistical material. Two meter services provide weekly reports of the number of sets tuned minute by minute to I.T.A. or B.B.C. programmes, and add a diary for the recording of the numbers of men, women, and children viewing each programme period or commercial. Other services are available to check the recall of programmes, or commercials, or both, and, by extension of the methods, to estimate the impression made by commercials and their sales effectiveness.

Of later years the information provided by Censuses of Production and Distribution have added much valuable information to industrial statistics. But in the changing conditions of these days it is not enough for a manufacturer to be able to compare, sev. years in arrear, his own production with the total output of his industry. Nor, if his product sells through hairdressers, chemists, etc., is it sufficient to know the total turnover of those outlets. Especially for those products that are seasonal, or where the wholesaler or the multiple firm plays an important part, monthly figures of factory sales can show alarming peaks and troughs. To plan economically it is necessary to know whether the market as a whole is growing or contracting and the rate of consumer buying of one's own and competitive products. For the last 16 years this has been possible for a variety of product groups sold through chemists and grocers, and more recently for confectionery and tobacco. Samples are constructed to be representative of the retailers in each trade, and trained field staff call every 2 months to take stock and record the quantity and cost of purchases, as shown by the manufacturers' and wholesalers' invoices, since their last visit. A manufacturer who subscribes to this service can learn in detail how retailers' purchases, sales, stocks, and displays of his product compare with those of competing lines.

Where a product is sold through a variety of types of outlet a consumer panel may be appropriate. A representative sample of households keeps a record in diary form of the brand, package size, and source of purchase of specified household goods, and in addition pantry or bathroom checks may be made quarterly by staffs of the organisations offering this service. Nor, in this connection, should we overlook the surveys

made by some of the national newspapers and magazines on the use of foods, beverages, household and toilet products. See also ADVERTISEMENT (with a bibliography) and MARKET RESEARCH.

Advocate (Lat. *advocatus*, from *advocare*, to call to one's aid) is the name given in ancient Rome and in many modern states, including Scotland (see ADVOCATES, FACULTY OF), to a forensic orator. In England the term is usually applied to barristers or counsel (q.v.), but solicitors appearing in magistrates' and co. courts are often called A.s.

Advocate, Lord, or, as he is sometimes called, **His Majesty's A.**, is the principal law officer of the Crown for Scotland, his duties corresponding in the main to those of the attorney-general for England. His office was created by James III in the year 1480, and his multifarious duties include that of public prosecutor. He has always played an important part in political affairs relating to Scotland, and for a long while was practically secretary of state for Scotland. He was *ex officio* a member of the old Scottish parliament, and after Walpole abolished the office of secretary for Scotland, and before the revival of that office in 1885, his power in Scotland was of a most far-reaching nature. Nowadays he is always a member of the ministry, but not of the Cabinet, and he and his assistants, the solicitor-general and the 4 A.s.-depute, resign when the gov. who appoints them resigns. A salary of £5000 is paid to him, but he is not precluded from taking private practice. The L. A. is often, but not always, a member of the Privy Council, but while in office is invariably addressed as the Right Honourable.

Advocates, Faculty of. All members of the Scottish Bar belong to this body and are called A. In privileges and liabilities their position closely resembles that of Eng. barristers. The F. of A. forms part of the College of Justice, which was founded in 1532; but A. in the King's Court existed for more than 100 years before that date. Limited in the first instance to 10, the membership of the F. of A. now exceeds 250, of whom about half practise. Admission to the F. of A. is by examination in general scholarship and in law. The general standard required is similar to that required in a Scottish univ. for the degrees of M.A. and LL.B. The fees payable on admission amount to nearly £450 at the age of 24. These fees include subscriptions to the widows' fund of the body and to the A. library maintained by the faculty. Higher fees are required for widows' fund contributions if the intrant is over 24 years of age. The Dean of Faculty is elected yearly and has precedence at the Bar over all other counsel except the Lord Advocate. The latter, together with the judges of the court of session and the sheriffs, as well as the Solicitor General for Scotland, is always elected from the F. of A. Only A. are allowed right of audience in the court of session.

The F. of A. continued to discharge

the duty imposed on A. by a statute of 1424 to assist poor litigants in civil cases, without fee (Poor's Koll), until the coming into force of the Legal Aid (Scotland) Act, 1949. Counsel for the poor in criminal cases, who act without fee, are appointed annually by the F. of A.

Advocates' Library, Edinburgh, founded in 1682 by Sir George Mackenzie for the use of the Faculty of Advocates. It was given to the nation in 1925 and is now the National Library of Scotland (q.v.). The law collection was retained as a professional library and is still controlled by the Faculty.

Advocation, process by which prior to its abolition in 1868 an appeal was made from the Scottish sheriff courts to the court of session.

Advocatus Diaboli (the devil's advocate), popular name of one appointed in the Rom. Catholic Church to set forth possible objections to any person whom it is proposed to canonise, i.e. admit to the calendar of the saints. His official title is *Promotor Fidei*. As the objections were generally not valid, and only made as a matter of form, the term A. D. has come to be applied generally to any person who knowingly puts forward arguments with which he himself is in disagreement.

Advowson, the right of presenting an eccles. benefice or 'living' in the Church of England. Such right rests in those who have founded and endowed churches, their heirs or executors, and those to whom they have transferred the right. An A. is a form of real estate and, subject to certain statutory regulations designed to prevent simoniacal practices, may be freely disposed of. It may pass with the sale of a manor, in which case it is called an *A. appendant*, or separately as an *A. in gross*. If the patron be a Rom. Catholic the right of presentation goes to the univ. of Oxford or Cambridge, whichever is nearest to the benefice. When the monasteries were dissolved, the A.s with great titles passed by Crown grant to some layman, called, in respect of tithes, an impropriator, and in respect of A. a lay rector or patron; but where no such separation has occurred the living remains a rectory. Recent legislation has much curtailed the right of sale of A.s and in time the right will cease altogether.

Ady, Endre (1877-1919), Hungarian poet, b. Erdmindszent, married Berta Boneza in 1915. The influence of modern Fr. literature (A. spent part of his youth in Paris) can be seen in many of his earlier poems. The violence, originality, beauty, and strength of his work make him the greatest poet of Hungary since Arany (q.v.). He d. in a Budapest sanatorium. See J. Kemenyi, 'Endre Ady, Hungary's Apocalyptic Poet,' in the *Slavonic Review*, 1944.

Adye, Sir John Miller (1819-1900), general, son of Maj. J. P. Adye, b. Sevenoaks, Kent, and educ. Woolwich. He served during the Crimean War and Indian mutiny. From 1870 to 1875 he was director-general of artillery, and in 1882 served in the Egyptian campaign. He was

promoted general in 1884. From 1882 to 1886 he was governor of Gibraltar. He unsuccessfully contested Bath in 1892. Pubs.: *The Defence of Cawnpore*, 1858; *Recollections of a Military Life*, 1895; *Indian Frontier Policy*, 1897.

Adytum (Gk *adyton*), place that may not be entered. In anct temples it was the innermost and secret chamber, where oracles were delivered and mysteries performed, and only the priests were allowed to enter therein.

Adzhara Autonomous Republic, in Georgia (Transcaucasia), formed 1921, lies in SW. Georgia, adjacent to the Black Sea and the Turkish border. It is largely mountainous; the seashore has a humid subtropical climate. Area 1100 sq. m., pop. 200,000, mostly Georgians and Russians. Some of the Georgians are Adzhars who became Muslim under previous Turkish rule. This area is the main producer of tea (since the 1880's) and citrus fruits in the U.S.S.R.; it also has oil refining and engineering. The cap. is Batumi.

A.E., see RUSSELL, GEORGE WILLIAM.

Aeacus, son of Zeus and Aegina, daughter of the riv. god Asopus. He was king of the Myrmidons, and for his justice and piety became one of the 3 judges in Hades. See Horace, *Odes*, II. 13; III. 19; IV. 8.

Aecidium (Gk *aikia*, injury), or **Cluster Cup**, fruit of a parasite plant belonging to the Uredinales, the rust fungi (q.v.). It is also the name of the genus of the fungi. *A. cancellatum*, the pear A., gives the pear-tree leaves a warty appearance in autumn; *A. berberidis*, the barberry blight, is responsible for the bright orange powdery-looking substance seen on the barberry, in reality the spores of the fungus.

Aediles, Rom. magistrates. The office was created in 494 BC. with the appointment of two plebeian A., whose name was derived from the *aedes* or temple of Ceres, centre of the plebeian cult. With the appointment of two curule or patrician A. in 367 BC, the office became representative of the whole people. It was elective, and its holders ranked next after the praetors. The duties of A. included (a) care of temples, public buildings, and markets; (b) supervision of public games. Until the time of Julius Caesar they also had charge of the city's corn supply, but in 45 BC Caesar appointed two *A. cereales* to perform this function, which was transferred by Augustus to the *praefectus annonae*.

Aedui, anct Gallic tribe inhabiting the modern Fr. depts of Saône-et-Loire and Nièvre and parts of the Côte-d'Or and the Allier, with their cap. at Bibracte. They were the first Gallic people to ally themselves with Rome, and rendered valuable aid to Caesar. In imperial times the A. were a *civitas foederata*, and the first members of their race to be represented in the Rom. senate.

Aedwine, see EDWIN.

Aeetes, son of Helios and Perso, King of Colchis, was the father of Medea and Absyrtus. See ARGONAUTS.

Aegadian Islands (It. *Isole Egadi*; anct **Aegades**, **Aegates**, or **Aegusae**), group of three small is. in the Mediterranean, off the coast of Trapani (q.v.) prov., NW. Sicily (q.v.). Their names are **Levanzo**, **Favignana**, and **Marettimo**. The defeat of the Carthaginians by the Romans in a naval battle here in 241 BC brought the First Punic War to an end (see CARTHAGE). The main industry is tunny fishing. Total area 15 sq. m.; pop. 6000.

Aegae: 1. Tn in Achaia on the Crathis, with a celebrated temple of Poseidon, originally one of the 12 Achaean tns, but its inhab. subsequently removed to **Aegira**.

2. Tn of Emathia in Macedonia, the anct cap. of Macedonia, and the burial-place of the Macedonian kings. It was also called **Edessa** (q.v.).

3. Tn in Euboea with a celebrated temple of Poseidon, who was hence called **Aegaeus**.

4. Also **Aegaeae**, 1 of the 12 cities of Aulis in Asia Minor, N. of Smyrna, on the R. Hyllus.

5. Seaport tn of Cilicia.

Aegaeon, son of Uranus (Heaven) by Gaia (Earth). A. and his brothers Gyes or Gyges and Cottus are known as the Uranids, huge monsters with 100 arms and 50 heads. Most writers mention the third Uranid as Briareus instead of A. Homer explains that men called him A., but the gods Briareus (q.v.). According to the most anct tradition, A. and his brothers conquered the Titans when they warred against the gods, and secured the victory for Zeus, who thrust the Titans into Tartarus, with A. and his brothers to guard them. Other legends represent A. as one of the giants who attacked Olympus; and many writers represent him as a marine god living in the Aegean Sea.

Aegagre, species of wild goat or ibex, found in the mts of E. Europe and of Persia, where it is called *pasang*. The oriental bezoar, a stone once supposed to possess medicinal virtues, is sometimes found in its stomach.

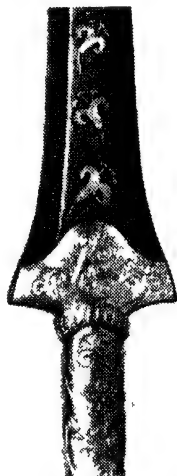
Aegates, see AEGADIAN ISLANDS.

Aegean Civilisation, the prehistoric culture first brought to light by the excavations of Schliemann and Dörpfeld at Troy, Mycenae, and Tiryns (qq.v.) in the second half of the 19th cent. It covers the period c. 3000-c. 1000 BC, extended over the whole Aegean area, and had as its twin centres **Cnossus** (q.v.) in Crete (q.v.) and Mycenae. The zenith of A. C. in Crete lasted from about 2000 to about 1400 BC; at Mycenae from the latter date to about 1000 BC, i.e. until the dawn of the so-called iron age. In 1870 Schliemann set out to find the site of Troy, and to prove that Homer's poems have some foundation. No site in the Troad can be certainly identified with Homer's Troy, but the mounds at Hissarlik, which have been thoroughly explored, first by Schliemann and afterwards by Dörpfeld, are accepted with much probability as the original site of Ilium. Schliemann dug with faith and enthusiasm, but without the scientific skill of the modern archaeologist. He reached his second stratum in 1873 and revealed a

burnt city, with treasures of gold, silver, and bronze. This find assisted in proving that the Homeric legend of Troy was not founded entirely on myth, but that a great civilisation fl. at least 1500 years before the starting point of Gk. hist. as given by Grote and others. Schliemann next (1876) excavated Mycenae. Here were found relics of a civilisation which acts as a link between that of Crete and the Gk.; the evidence suggests that a sudden introduction of Cretan civilisation took place. His belief that the tomb of Agamemnon lay within the gates of the citadel caused him to dig a pit some 100 ft sq., about 40 ft from the great 'Lion gate'; stone slabs were first unearthed, then a circular altar with steles carved in relief. Three feet below the altar lay the first of five shaft graves, hewn from the rock. The roofs had collapsed, and buried with the bodies beneath the debris was a remarkable treasure—gold masks, head-bands, breast-pieces, rings, pendants, daggers, and sword hilts, also objects of ivory, amber, silver, and bronze; 60 swords and daggers were found in one grave alone. Schliemann was convinced that these were the actual graves seen by Pausanias, containing Agamemnon and his household. Whether that is true or not we cannot prove; what was proved was the excellence of the metal work and other treasures, showing a highly advanced civilisation belonging to a wealthy prehistoric people. It is possible that this shaft-grave dynasty was estab. by some great family coming from Crete, bringing Minoan (Cretan) civilisation with them. The beehive tombs were explored next, the largest being the well-known 'treasury of Atreus'; it was strongly built, with a passage leading to a high vaulted chamber shaped like a beehive. The door to the chamber was 17 ft high, bordered with columns carrying a cornice masked with red porphyry, with spiral decorations, enriched with bronze and coloured marble ornaments; rich decorations were visible everywhere showing a high standard of artistic achievement. A tomb not far from the 'treasury of Atreus' that Schliemann explored, and believed to be the grave of Clytemnestra, showed beautiful designs in green alabaster and coloured marbles. Archaeological work at Mycenae is still (1956) in progress, and important discoveries were made as late as 1954. From Mycenae he went to Orchomenos in Bocotia, and here other excavations showed the same rich ornament and fine workmanship, influenced by Egyptian art. Later (1884) at Tiryns his work laid bare the entire plan of a citadel palace, with towers, galleries, sleeping apartments, and living-rooms. A frieze of alabaster carved in rosettes and inlaid with vivid blue paste was found, also excellent fresco painting. After Schliemann's death Dörpfeld and others continued his work. Mycenae was still considered to be the chief home of this great culture until Crete was explored.

Crete disclosed a period of civilisation belonging legitimately to the whole

Aegean, scarcely less ancient than that of Egypt. The untiring work of Sir Arthur Evans (1895-1930) has discovered for us the interesting conditions of art and architecture belonging to the Minoan periods. The prin. excavations in Crete have been at Cnossus, Tylissus, and Hagia Triada (see CRETE). It was here that the A. C. apparently had its fountain head. For the general evidence of this culture there are ruins of palaces, villas, houses, and beehive graves; the decorations and architectural features are columns, friezes,



Ashmolean Museum
FACSIMILE OF DAGGER INLaid
WITH GOLD LILY PATTERN
FROM MYCENAE.

mouldings, various mural paintings, and mosaic inlay, etc. Vessels have been found, from tiny pots to huge stone jars, and quantities of pottery. One of the general features of Aegean pottery is the stirrup-cup or false-necked vase, so-called from the fact that the neck to which the handles join is closed, or false, and another neck is fashioned further away from the handles for convenience in pouring out. These occur wherever this great culture has been brought to light, and are the typical pottery of that period known as Late Minoan III (Crete).

Many fragments of Cretan pottery have been discovered in Egypt, and it seems probable that a considerable trade was carried on between the countries. Similar objects have been found in Sicily and Spain, and there were colonies on the Syrian and Turkish coasts. Large quantities of amber from the Baltic show the extent of trade. The two famous Vaphio cups, discovered in 1889 by Dr Tsountas, were found in a beehive tomb; they were among many beautiful articles of gold,

silver, bronze, crystal, etc. The cups are of gold, decorated in relief with scenes depicting the capture of bulls; they belong to the late Minoan I period, and represent a triumph of ancient art. Thrones, seats, and tables in stone and terra-cotta have been found, objects of art in ivory and precious metals, small sculptured works, but no large ones, jewellery of various kinds, weapons in metal, only a few later ones being of iron, engraved gems and gem impressions. Tombs of pit or dome-shaped style were also found, paved roadways with bridges and an excellent system of drainage, and, lastly, two main systems of script which as yet remain undeciphered. The principal deity was a mother-goddess, both in Crete and Mycenae, her symbol of the double-axe being frequently discovered in excavations. The dead were not burnt, but buried with great honour, apparently with the hope of a future life; there was possibly a hero-cult of the dead. The social organisation indicates a considerable body of law and a luxurious ruling class. See A. B. Wace, *Antiquity*, 1943.

Aegean Sea and Islands, name used by the Greeks and Romans for that part of the Mediterranean Sea between Asia Minor and Greece. It contains, amongst many other is., the Cyclades and the Sporades and the Dodecanese group. The Dodecanese Is.—Rhodes, Carpathos, Cos, Symi, Astypalaea, Patmos, Casos, Castellorizo, Nisyros, Leros, Calymnos, and Telos—were in its occupation until late in the Second World War. Italy occupied some of the Dodecanese Is. during the Tripolitan war, 1911–12, at a time when they belonged to Turkey. In the First World War Greece, as the price of joining the Allies in the Dardanelles campaign, demanded the A. Is., but further bargaining by Venizelos (q.v.) was stopped by King Constantine, who dismissed his Premier. Later in the same year Italy demanded as compensation from Austria-Hungary the *de jure* sovereignty of the A. Is. In the post-war settlement Greece was granted all the coasts and is. of the A. S., but after further negotiations, by the treaty of Sevres, 1920 (not ratified), superseded by the treaty of Lausanne, Italy received the Dodecanese Is., Imbros and Tenedos went to Greece, and Turkey recognised Grecian sovereignty in Lemnos, Samothrace, Mitylene, Chios, Samos, and Nikaria. Following a short military campaign by Greece against Turkey the treaty of Lausanne, 1923, was more favourable to Turkey: in the A. S. Turkey received Tavşan Is., Imbros, and Tenedos; Italy again had the Dodecanese, including Rhodes, while Greece received most of the remaining is. On 16 Sept. 1943, following Italy's surrender, allied forces landed on Samos, Leros, and Cos, and joined the H. garrisons there. But on 3 Oct. the Germans delivered a strong attack on Cos, which they took. They then turned to invade Leros, which the British held until 16 Nov.; and as a result Samos was evacuated and the projected allied invasion of the Balkans had to be postponed. Had not the Italians

surrendered Rhodes and its aerodromes to the Germans without firing a shot, Cos and Leros might have been held, although in order to attack the is. the Germans had to divert land, sea, and air forces from Italy and Russia.

Aegeus, King of Athens, was the son of Pandion and father of Theseus, by whom he was restored to the throne (from which he had been driven by the 50 sons of Pallas). Theseus went to Crete to deliver Athens from the tribute it had to pay to Minos, promising that he would hoist white sails on his return as a signal of his safety. However, he forgot to do so, and A., thinking his son had perished, threw himself into the sea. From this event the Aegean Sea, according to one tradition, received its name.

Aegialos, see **ACHAEA**.

Aegidius Romanus, see **COLONNE**.

Aegina, small rocky is. and tn in the Gulf of A. or Saronic Gulf. On a hill in the NW. of the is. was the temple of Zeus Panhellenius, the ruins of which still remain. It was occupied by the Achaei (Homer, *Iliad*, II) and afterwards by Dorians. It became a place of great commercial importance (Herodotus, II. 178; VII. 147), and its silver coinage was the standard in most of the Dorian states. In the 6th cent. BC it was an independent and powerful state and the chief seat of Grecian art. In 429 BC the Athenians took possession of the is. and expelled the inhab. (Thucydides, II. 27). Area 32 sq. m.; pop. (is.) 9000, (tn) 5000.

Aegis, emblem of Zeus and of Athena, mentioned in Homer, where it is evidently a thundercloud. In later art, from the 6th cent. BC, the A. is represented as a goatskin covering the shoulders, or hanging from the left arm, of Athena. The fringe of serpents may signify the ragged edges of the cloud, though it is more likely that the confusion between cloud and skin is due to similarity between the Gk words for goat (*aix*) and hurricane (*kataigis*).

Aegisthus was the son of Thyestes, whom he placed upon the throne, driving away his uncle Atreus. According to Homer, A. took no part in the Trojan war, and during the absence of Agamemnon he seduced his wife Clytaemnestra (*Odyssey*, III. 329). He helped to murder Agamemnon on his return home, and reigned for 7 years over Mycenae (*Odyssey*, III. 388). Orestes, the son of Agamemnon, then killed A. (*Odyssey*, III. 242). Aeschylus, Sophocles, and Euripides also give accounts of this story.

Aegium, tn of Achaia, on the Corinthian Gulf, in ancient times chief city of the Achacan League. It was a legendary bp. of Zeus. Vostitza, the modern tn, exports currants.

Aegospotami ("goat's riv."), small riv. flowing into the Hellespont and a tn on it, in Thracian Chersonesus. Here Lyfander utterly defeated the Athenians, 404 BC.

Aegrotat (Lat., 'he is ill'), medical certificate given to univ. students to explain their absence from lectures. An A. degree is sometimes given to students unable to sit for their final examination on account of illness, but whose known

proficiency justifies the bestowal of a degree without examination.

Aegusae, see AEGADIAN ISLANDS.

Aegyptus, King of Egypt, son of Belus, and twin brother of Danaus, had 50 sons, and Danaus 50 daughters. Danaus, fearing the sons of A., fled with his daughters to Argos, where they followed him and demanded his daughters in marriage. Danaus granted their request, but, giving each a dagger, ordered them to murder their husbands on the wedding night. All perished except Lynceus, the husband of Hypermnestra, who disobeyed.

Aehrenthal, Aloys, Count von (1854-1912), Austro-Hungarian diplomat and politician, b. Bohemia, and educ. Prague and Bonn Univs. He entered the diplomatic service, 1877, as attaché to the Paris embassy; later he served in St Petersburg as attaché, councillor, and finally ambas. In 1906 he succeeded Goluchowski as Foreign Minister. Thenceforth he directed the foreign policy of the dual monarchy till his death. He was friendly to Italy; and had little belief in the disinterestedness of Ger. support of his annexation (in defiance of the treaty of Berlin) of Bosnia-Herzegovina, Oct. 1908: one link in the chain of causes of the First World War of 6 years later, although A. himself is generally identified with the peace party in Austria-Hungary.

Aelric (d. 1005?), distinguished Saxon prelate, became abbot of St Albans, Bishop of Wilton, and Archbishop of Canterbury (from 995 until his death). He was one of the most learned ecclesiastics of his time.

Aelric (c. 955-c. 1022), Brit. prelate and writer. He has been confused with A., Archbishop of Canterbury from 995 to 1005, and with A., Archbishop of York, but it is certain that he was a pupil of Aethelwold, and most probable that he was an abbot at Winchester. He afterwards became abbot of Cerne and of Eynsham; but he is most celebrated for his 2 books of *Homilies*, trans. from the Lat., and ed. by Thorpe for the A. Society (1844-6). They are a good illustration of the doctrine of the early Eng. Church. Among his other works are *A Latin and English Grammar and Glossary* (from which he is called Grammaticus), first printed by Somner, 1659, *Colloquium*, and *A Treatise on the Old and New Testaments*; besides trans., epistles, and other treatises.

Aelia Capitolina, name given to Jerusalem by the Emperor Hadrian when he expelled the Jews and there estab. a Rom. colony, AD 135.

Aelianus, Claudius (late 2nd-early 3rd cent. AD), Gk writer, b. Praeneste. All that survives of his work is the *Variae Historiae*, *On the Nature of Animals*, and some imaginary letters. These have been ed. by R. Hercher (*Aeliani opera*, 2 vols., 1864-5).

Aella, see ELLA.

Aelred, Ailred, or Ethelred, St (1109-1167), religious mystic and historian, b. Hexham, and at an early age entered the household of David I of Scotland. He refused a bishopric, becoming a monk in the Cistercian abbey of Rievaulx. Later

he was elected abbot of Revesby, Lincs, in 1143, and of Rievaulx itself in 1146. He was noted for his gentleness and asceticism. On a mission to the Picts of Gallows in 1164 he induced the chief to become a monk. His feast is on 12 Jan. His works, which have never been collected in a complete ed., include the *Vita et Miracula S. Edwardi Regis et Confessoris*, *De Bello Standardii* (fought in 1138), *De Spirituali Amicitia*, and *De Anima* (ed. C. H. Talbot, 1952). See the *Life of Aelred* by Walter Daniel, a monk of Rievaulx (ed. Sir M. Powicke, 1950) and T. E. Harvey, *Aelred of Rievaulx*, 1932.

Aeltre (Flom. Aalter), industrial tn in the prov. of W. Flanders, Belgium: manufs. canvas and exports oil. Pop. 7000.

Aemilian Way (Lat. *Aemilia Via*), famous highway of anc. Italy which continued the Via Flaminia from Ariminum (Rimini) through Bononia (Bologna) to Mutina, Placentia, and Mediolanum (Milan). It was constructed by M. Aemilius Lepidus, consul in 187 BC. It was afterwards extended to Aquileia, Augusta Praetoria (Aosta), and Segusio.

Aemilius Paulus, Lucius, see PAULUS, LUCIUS AEMILIUS.

Aenaria, see ISCHIA.

Aeneas, hero of Virgil's *Aeneid*, son of Anchises and Aphrodite; b. on Mt Ida, and was next to Hector, the greatest of the Trojan heroes. After the capture of Troy he left the city carrying his aged father on his back, but in the confusion lost his wife Creusa (q.v.). He sailed to Thrace, but, misinterpreting the oracle of Delphi, went to Crete, and thence to Ephrus and Sicily. From there he was driven by a storm to N. Africa, where he met Dido and tarried with her for a while. She vainly loved him, and on his departure killed herself. Finally he sailed to Latium, founded Lavinium, and married Lavinia, daughter of Latinus, King of the Aborigines. Turnus, to whom Lavinia had been betrothed, fought Latinus and A. and was killed. A. became sole ruler of the Aborigines and Trojans, uniting both nations into one. Turnus was killed by A., and A. himself was killed in battle with the Rutulians.

Aeneas Silvius, son of Silvius, and grandson of Ascanius, was the third of the mythical kings of Alba in Latium.

Aeneid, the greatest work of Virgil, and the national epic of the Rom. people. It was completed in 12 books, but as he had not revised it Virgil expressed a wish that it might be destroyed. It was, however, pub. after his death by order of Augustus. It contains an account of the wanderings and the settlement of Aeneas after the siege of Troy. It has been often trans. into Eng. both in prose and verse. See VIRGIL.

Aeoliae Insulae, see LIPARI ISLANDS.

Aeolian Harp, musical instrument consisting of a wooden box over which are stretched sev. catgut strings of different thicknesses tuned in unison. When exposed to the wind harmonious sounds are produced. It is supposed to have

been invented by St Dunstan, but the present A. H. was not known until about the end of the 16th cent. It is mentioned in Thomson's *Castle of Indolence*.



AEOLIAN HARP

Aeolian Islands, see LIPARI ISLANDS.

Aeolians, one of the branches of the Gk race, who originally dwelt in Thessaly. From there they settled in N. Greece and Peloponnesus. They also emigrated to the NW. of Asia Minor, establishing 12 cities along the coast dist. known as Aeolis, and to Lesbos and Tenedos.

Aeolipyle, or **Aeolippe** (from Lat. *Aeoli pylae*, the gates of Aeolus), a metallic ball partly filled with water, and having tubes projecting horizontally. When heated steam rushes out of the tubes, setting the ball in motion. It was first described by Hero of Alexandria.

Aeolis, see AEOLIANS.

Aeolus: 1. Ruler of Thessaly, and legendary founder of the Aeolic branch of the Gk race.

2. Son of Hippotes, or, according to others, of the god Poseidon. According to Homer he was the ruler of the Aeolian Is., and was given power over the winds by Zeus. See also Ovid, *Heroides*, xi. 65-128.

Aeon (Gk *aiōn*), an age or immense period of time, also a being that lives for ever. The Gnostics used the term to indicate manifestations from God, i.e. spirits which form a separate existence, having influence over phases of the world's progression.

Aepinus, Franz Ulrich Theodor (1724-1802), a Ger. natural philosopher, b. in Rostock, Saxony. He is most widely known for his works on research in magnetism and electricity. He pub. *Tentamen Theoriae Electricitatis* in 1759, and among other works memoirs on astronomy and kindred subjects.

Aepyornis, huge, wingless, extinct ratite bird, the existence of which may explain the fabled roc of Arab legend. It belonged to the order Aepyornithiformes containing a number of allied forms. The former existence of the bird was inferred from the eggs found in the marshes of Madagascar, which were 36 in. in circumference, and from the later discovery of bones which showed that the A. was much larger than the Apteryx or kiwi of New Zealand. It resembled the ostrich, had long, thick legs, 4-toed feet, rudimentary wings, and stood over 7 ft high.

Aequi, anct It. tribe which, together with the Volsci, waged continual warfare against Rome until their final subjugation in 302 Bc. Dwelling originally in the upper valley of the Anio, they afterwards extended as far as Latium. One of their prin. strongholds was Mt Algidus.

Aequum Tuticum, see ARIANA.

Aerated Bread is made from dough prepared by mixing the flour with water strongly charged with carbon dioxide. This process produces the requisite degree of porousness in a few minutes, as compared with hours by the ordinary yeast method.

Aerated Waters, water, solutions of salts, and diluted flavoured syrups or sweetened fruit juices artificially carbonated to form 2 to 5 vols. CO₂ in bottle, 5½ to 7 in syphons. They were first attempted by Thurneysser in 1560, later by Hoffman, 1708, and Geoffroy, 1724. Venel demonstrating his method in France in 1750. Joseph Priestley (q.v.) experimented, 1767-72, and proposed sev. improved methods, including the use of a pressure pump, these being developed by Paul, Schweppe, and Gosse commercially with success. The term A. W. is not here applied to natural spa waters (see MINERAL WATERS), or to beers, sparkling wines, ginger beers, etc., produced by fermentation (q.v.).

In former A. W. factories, CO₂ was generated on the premises from sulphuric acid and a carbonate, but in the U.K. and U.S.A. is now invariably purchased as liquid in cylinders, as a solid (dry ice) in blocks, or in bulk, a road tanker delivering the gas to a large medium pressure tank. A high degree of mechanisation obtains, carbonating apparatus being entirely automatic, while in most bottleries all component production machines are linked and synchronised by flat bottle conveyors and star wheel transfer devices to provide a continuous 'robot' line, the processes being mechanical uncasing of bottles, bottle-cleaner loading, automatic bottle-washing, clean bottle inspection, syringing, filling and closing (on one machine), mixing of syrup and charged water after sealing, contents inspection (visual or electronic), labelling, and mechanical casing. Palletisation, with or without automatic pallet loading, is widely employed for warehousing and lorry loading. Syrups are prepared and flavoured in stainless steel, etc., tanks, a high degree of automation being used, the 'syrupor' automatically dosing a fixed proportion of syrup to each bottle. The seltzogene for home use derives from Dr Nooth's apparatus, 1774; the syphon from Charles Plinth's 'Fountain', 1813, Patent No. 3680, syphons being introduced to the U.K. about 1837. Much later a home syphon to which a capsule of high pressure CO₂ was affixed and the gas absorbed was developed. The crown cork, invented by Wm Painter, 1892, is the usual small bottle closure, large vessels being secured by screw stoppers, screw caps, or swing stoppers.

For legal guidance codes of practice for soft drinks and spa waters have been drafted, the former citing quality standards for sweet drinks and 'soda water' (to contain at least 5 grains per pint sodium bicarbonate). The spa waters code covers natural mineral waters (q.v.) and manuf. types, e.g. lithia and potass waters, which must contain 'not less than

5 grains per pint of the appropriate bicarbonate.' As compared with a consumption of approximately 100 million gallons of 'unconcentrated' soft drinks (mainly A. W.) in 1938, the figure for 1955 was nearly 185 million gallons out of a total for all soft drinks produced in the U.K. of 302 million gallons (as a ready to drink product).

Aerial, or antenna, in radio communication, the conductor or system of conductors from which electromagnetic waves are emitted, or which is set in (electric) vibration by the waves at the receiving station. The simplest form is a vertical wire earthed at the base and of length equal to $\frac{1}{4}$ of the wavelength, in resonance (q.v.) with and coupled to the generating oscillatory circuit of the transmitter. The 'effective length' can be increased by inserting a variable reactance at the base. A more modern form is the dipole A. of $\frac{1}{2}$ wavelength, the current-wave having its nodes at the ends. It may be mounted horizontally or vertically. The A. is coupled to the transmitter by a capacitive tapping off the induction coil or by various forms of tuning circuit. A. arrays, loops, and frames of many different designs are used. Sometimes trees or balloons have served as A.s. In N. Sweden the conductors of the overhead high-voltage transmission lines are used as A.s for broadcasting (see BEAM WIRELESS).

Aerial Navigation is the science that deals with all points of practical flying, outside the actual working of the machine itself. It includes fixing geographical position, maintaining a course, and selecting an altitude favourable with regard to wind and weather.

The simplest way of fixing position is by recognising landmarks on the ground, and map-reading still forms an important part of a pilot's training. But many flights are made above cloud, over water, or at night, when no landmarks are visible, and navigators then fix their position by what is called dead reckoning. When working out his position by dead reckoning the navigator must know the aircraft's speed through the air, its direction of flight, and the strength and direction of the wind. If there were no wind and the aircraft flew at a steady 200 m.p.h. between two airports 400 m. apart, after one hour it would be half way. Obviously if it had a 20 m.p.h. tail-wind it would be more than half way, but the navigator could easily calculate its exact position, because the true speed of the aircraft would simply have been increased by 20 m.p.h. More often there is a cross-wind, tending to blow the aircraft off course. Then the navigator must calculate the effect of the wind, so that the pilot can fly the aircraft at an angle to its required course, known as the drift angle, to compensate for the wind. There are sev. ways in which the air navigator can supplement and check the information he obtains by dead reckoning. At night he can fix his position by 'shooting' the stars with a sextant. Many different radio and radar navigation systems are also available.

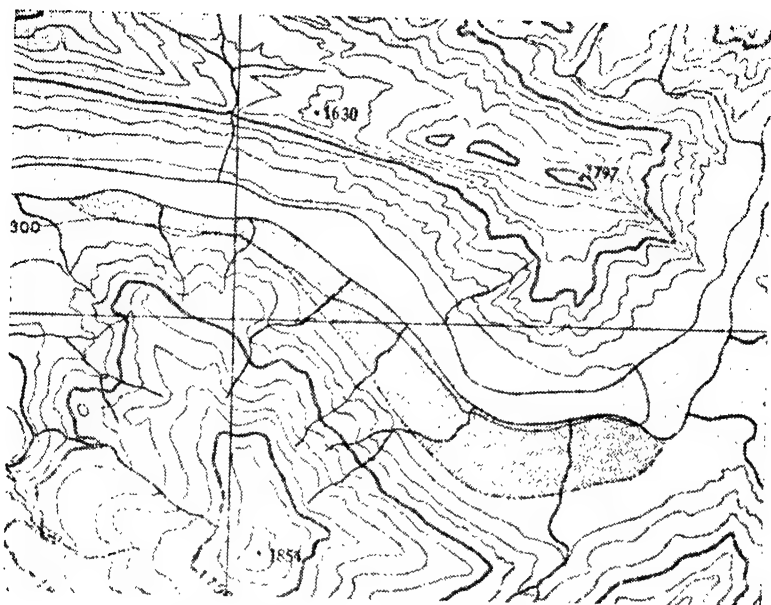
Most simple is radio direction finding, in which the compass bearing of a radio station or beacon on the ground is obtained by means of a small rotating direction finding loop aerial on the aircraft, which picks up the signal from the ground transmitter. Knowing the precise position of this station or beacon and the compass bearing of his own course, the navigator can fix his position at the intersection of the two bearings.

Radar systems usually involve the use of three ground stations, of which one is known as the 'Master' and the others as 'Slaves.' If the Master and one of the Slaves transmit signals simultaneously, the special receiving set in the aircraft can compute the time interval between the arrival of the two signals. As the signals travel at a uniform speed, the magnitude of the time interval fixes the aircraft's position as being on a curved 'position line,' at every point on which the difference in distance between the two stations is the same. By obtaining a similar position line from the Master and the second Slave, the navigator can fix his position at the point where the two position lines intersect. In some systems the navigator has to calculate this position by reference to special charts. In the Decca system the whole operation can be performed electronically, and the aircraft's position is shown with great accuracy as a continuous track drawn on a moving chart known as a Flight Log.

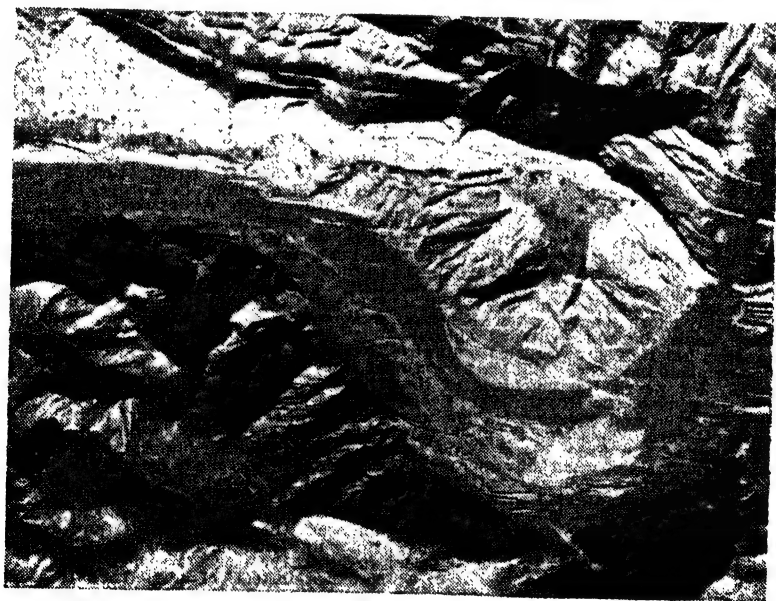
Many other navigational aids are in worldwide service, and in busy traffic areas, such as over the U.K., airliners have to fly at specified height and speed and on a specified course along rigidly controlled 'sky tunnels' known as airways, under radar control from the ground; whilst in the airways the position of each aircraft is kept under constant observation by ground radar observers, and a short-range version of their equipment, known as ground control approach (G.C.A.) equipment, can fix the position of an aircraft so accurately that it is used to 'talk down' a pilot—with the operator telling him his position and height at frequent intervals by radio—at night or in bad weather, until he can see the runway. An alternative 'blind' landing aid is the Instrument Landing System (I.L.S.), which fixes the aircraft's position automatically by the use of ground radar equipment, telling the pilot by means of simple instruments when he is on the correct glide path for a safe landing. See E. B. Williams and W. J. V. Branch, *Air Navigation, Theory and Practice*, 1952; D. C. T. Bennett, *The Complete Air Navigator*, 1954; P. V. H. Weems, *Weems System of Navigation*, 1955.

Aerial Perspective, see PERSPECTIVE.

Aerial Surveying is carried out by photographs taken from an aeroplane flying as nearly as possible horizontally, the camera pointing vertically downwards. Each part of the ground should be covered by at least 2 photographs and the positions of a number of points determined by ground surveying (ground



AERIAL SURVEY FOR TOPOGRAPHICAL MAPPING
Map produced from the photograph shown below. Scale 1 : 10,560, with contours at 50-ft vertical intervals.



AERIAL SURVEY FOR TOPOGRAPHICAL MAPPING
From this photograph was produced the map shown above, both reproduced by permission of Hunting Aerosurveys Ltd.

control points). In the 'Arundel' method a number of parallel strips overlap laterally by 30 per cent and the shutter speed of the camera is regulated so that successive exposures overlap in the direction of flight by 60 per cent, thus providing an area common to 3 successive exposures. This common overlap of 20 per cent is essential for joining the photographs of a strip together when used for mapping. Sometimes multiple-lens cameras are used, taking 1 vertical and up to 6 oblique photographs in one exposure. The obliques show hills, ravines, and other features. In plotting the map the ground-control points are first laid down and the details are traced from the photographs and fitted into the frame. Contours may be obtained by the use of a stereoscopic camera. Modern instruments such as the compound stereoscope and automatic plotter have facilitated accurate A. S. on a large scale, allowing for varying height and tilt of the aeroplane. A. S. requires elaborate and costly equipment, and interpretation of photographs and plotting of maps is a matter for experts, but the method is valuable for revision of existing maps and reconnaissance for roads, railways, and transmission lines, and yields important information on geological and archaeological features. It has been of great value in both world wars for detection of enemy movements and for revealing camouflage. Use of specially sensitised plates and light-filters enabled photographic evidence to be obtained from heights where visual observation was ineffective. A. S. was used for mapping 125,000 sq. m. of Ontario and for exploration of oil resources in Columbia. See M. Hotine, *Surveying from Air Photographs*, 1931, and C. A. Hart, *Air Photography Applied to Surveying*, 1940.

Aerial Warfare. Experimental period. Military aviation was in the experimental stage in 1912. The Central Flying School at Upavon was opened in that year and a beginning was made in the instruction of pupils in map-reading and signalling. In the same year military aeroplane trials were held on Salisbury Plain with a view to finding the most suitable type of fast good-climbing machine, able to take off and alight on rough ground, and to pull up within a reasonably short distance after alighting. These trials did not evolve a suitable machine, but they gave a real stimulus to the aeroplane industry. But the sole use in war for which the machines of the military wing of the Royal Flying Corps were designed and the men trained were reconnaissance. This was so up to the beginning of the First World War. It was in the stress of war that experiments in other directions, such as 'spotting' for artillery fire, were applied with practical effect on a large scale. The Brit. military wing was much smaller than the military air forces of either France or Germany, and was designed merely to operate with a O-Division Expeditionary Force as the 'eyes' of that force. Later, when the Germans were forced back from the

Marne (Sept. 1914), the function of co-operating with the artillery became one of the first importance. During the war, too, the aeroplanes usurped many of the duties hitherto believed possible only for the airship—namely, aerial photography, bombing, and the sending and reception of wireless messages.

The naval wing of the Royal Flying Corps developed on different lines from the military wing. Co-operation with the navy required conformity to the doctrine that the best defence is attack. Though aircraft were capable of defending the Brit. coasts, they were not as yet (1912-13) in theory capable of carrying war whithersoever the fleet might go. In 1913 the Admiralty adopted the policy of evolving 3 new types of machine: an oversea fighting seaplane capable of operating from a battleship as base; a scout to work with the fleet at sea; and a home-service machine for driving back enemy aircraft from our coasts and for patrolling the coast. Progress was slower than with the military wing because the problems were more difficult. The detection of submarines from the air and the use of depth charges by surface craft acting in co-operation were a problem which called urgently for solution. Experiments gradually yielded results, but it was not really until the Second World War that aircraft proved to be the U-boat's master.

Progress was made in the early years of the war in bomb attack by means of an efficient dropping gear, in the effective use of small-bore fire-arms against attack by Zeppelins, especially by the invention of the tracer bullet, and in the mounting of machine-guns on aeroplanes.

Development in First World War. The Ger. Army at the outbreak of war possessed 12 rigid airships and were constructing others. Their airship engines were of 200 h.p. and more, and were capable of modification for use in aeroplanes. Probably Great Britain had the fastest machines in Europe, but pre-occupation with reconnaissance handicapped the Brit. service in other directions, so that for a time both the Ger. and Fr. armies were more adequately equipped for A. W. than the small Brit. expeditionary force. Early in the war, however, the Brit. machines rendered most essential service. Numerous reconnaissances during the Great Retreat (Aug. 1914) gave Sir John French accurate information on the location of the enemy and of his batteries. The Great Retreat also saw the beginnings of fighting in the air as distinct from reconnaissance and artillery-fire direction. About this time an important change in organisation was made by the decentralisation of the Royal Flying Corps, so that certain squadrons were attached to the corps commands. This experiment, which followed the Ger. organisation, saved time by enabling observers to report direct to the corps to which they were assigned instead of going back to their own centre. In the Ger. Army the pressure of duties on so extended a front made

it impossible to do much more than reconnaissance work, although its flying force was very large. Its most active machines were the single-seater scouts and later, the 'trench-strafting' machines. The precursors of these latter were the escort squadrons originally estab. for the protection of 'working machines.' The function of the escort was to ward off attack from the 'working machines' which were carrying out patrols or observations. The 'trench - strafting' machines flew by day over Fr. and Eng. trenches, dropping bombs, and then, at night, flew behind the lines to damage billets, stations, and other objectives. The prin. duty of the artillery observation machines in the 1917 operations consisted in relieving the pressure upon the infantry by subduing the allied artillery (Alsne-Champagne front). In every group certain machines were told off to undertake fire control for Ger. long-range guns. Bombing squadrons came under the direction of the army groups, and were used against depots, camps, and other traffic centres. Duels in the air became very common in the later years of the war. The term ace became the accepted title of a Fr. airman who had 'bagged' a certain number of enemy machines. In the last 2 years of the war all the duties enumerated in this article had come to be performed by all the flying forces on either side, and A. W. had reached, under the stress of war, a pitch of development which before the war had hardly been dreamt of.

Later aerial warfare. Air raids and air attacks were extensively employed as an instrument of modern warfare in Ethiopia, China, and Spain; but in none of these instances was any effective resistance possible. In Ethiopia (q.v.) the abrupt termination of the war in the early months of 1936 was largely due to the terror inspired by air raids; in the Sp. Civil War, 1936-9, the bombing of Guernica, Barcelona, Madrid, and many other open towns by Franco's machines was a decisive factor against the Republicans, who had no great resources in either bombing machines or fighters; while the Jap. bombing of Hankow and Canton soon reduced those places to submission. Before the outbreak of the Second World War many experts made ingenious and not entirely inaccurate predictions of the kind of thing that would happen in the air in a new major war. In particular, numerous books appeared giving alarming accounts of the effects of bombing on large cities, and there were not altogether unjustified pictures conjured up of tremendous air battles. In this respect Gen. Douhet's works had considerable influence among air staff officers all over the world. Had Douhet lived he would have had some difficulty in adjusting the facts of the battle of Britain to his theories, for he expatiated always on the offensive qualities of aircraft, having little belief in their defensive powers. Yet if he did not foresee the power of the fighter he foresaw that of the bomber. He described almost exactly the kind of

tactics which the day bomber forces of the U.S. Eighth Army Air Force employed in its raids on Germany in 1943-5—the close formations which were held at all costs and the great fire power. But again he underestimated the effectiveness of the fighter defences against these attacks in many instances. Douhet wanted the armies and navies to be concentrated on defending and holding, while every effort should be expended on constructing huge fleets of bombers which would assume the entire responsibility for offensive operations.

Although no attainable bomber force in the Second World War could do what Douhet suggested—completely destroy a target in a single attack—the cumulative effect of repeated attacks was almost as destructive; while the lesson of Hiroshima and Nagasaki in 1945 proved that 1 aircraft carrying an atomic bomb could achieve more than the largest bomber force not armed with atomic bombs. A. W. developed enormously in the Second World War, and indeed it is not too much to say that the aeroplane became the master weapon, counteracting the earlier doctrines of sea-power and rendering gallantry in defence by large and well-equipped forces nugatory where these latter were inadequately supplied with aircraft, as, for example, in the Cretan campaign, the Gk campaign, and in the Jap. invasion of the Malay Peninsula. Moreover, in the Second World War, bombing of ins. as was expected, became a common feature. Against military objectives aircraft were often a decisive factor, e.g. in the attack by naval aircraft on the It. fleet at Taranto and in the constant bombing of the Ger. munitions centres in the Ruhr. The Jap. plane attack, without any previous declaration of war, on Pearl Harbour in 1941 was also decisive in immobilising Amer. naval power in the S. Pacific.

British policy of strategic bombing in Second World War. Early in 1942 parl. critics cast doubt on the military effectiveness of strategic bombing and regarded the Gov.'s decision to open a 'second front' at some time as implying an acknowledgment of the failure of its bombing policy. The escape of the Ger. ships *Scharnhorst* and *Gneisenau* from Brest, notwithstanding repeated bombings, lent plausibility to the arguments of the critics of long-distance bombing; but their arguments, if valid, would have discredited bombing as such, whether long distance or otherwise. There was little justification for the fear that strategic bombing was carried out without regard to the requirements of the other arms; indeed the bombing of Brest and Lorient was motivated by the hope of helping the navy and mercantile marine against the submarine menace. Moreover at times the great raids on Germany ceased whenever other and more pressing tasks called for the diversion of aircraft; e.g. there was a lull after the 1000-bomber raids on Cologne and Essen (May-June 1942) owing to the urgent requirements of the Middle E. Command,

where the situation had become very dangerous, and in order to co-operate with Coastal Command and the R.N. in the battle of the Atlantic, at that time the most vital of all theatres of war. The role of the R.A.F., far from being entirely independent, was also to co-operate with the army in the tactical field. This was shown by Air Vice-Marshal Tedder's brilliant operations in Libya in 1942 in support of Gens. Alexander and Montgomery against Rommel at El Alamein. Actually Bomber Command's strategical operations, though widely advertised, had not up to July 1941 done Germany's war potential any great damage, and no doubt the pilots and air crews were deceived on some occasions by the ingenious devices which the Germans adopted to mystify them, especially that of lighting large fires outside centres which were about to be bombed so as to induce the raiders to drop their bomb-loads there and not on the real target. Brit. bomb-loads in 1940-1 were puny judged by the standards of 1942 and later, and were incapable of doing any serious amount of damage, e.g. 15 tons was regarded as a formidable weight, but 1500 tons or more were often dropped in 1943 in well under an hour's bombing; and also the number of incendiaries dropped was insignificant in comparison with those subsequently scattered. The greatest load ever dropped on London or anywhere in Britain by Ger. bombers was 450 tons. The benefit which the Bomber and Fighter Commands' activities conferred on Britain's Russian allies was obvious from the transfer of fighter squadrons of the Luftwaffe from the E. to the W. front. Further, Bomber Command's activities in this earlier period kept the spirit of attack alive at a time when the Brit. Army could do but little and when the navy's work was obscured in the mists of the Atlantic. The only arm which could hit the enemy was the Air Arm, and while the Coastal and Fighter Commands struck whenever opportunity offered, Bomber Command struck all the time. Even in 1940 Brit. bombing raids were widespread. In 3 nights in Sept. of that year they attacked objectives in over 40 cities. Long before 1943 Ger. raids over Britain had grown insignificant; those over Germany had become avalanches.

Limitations of international law re-interpreted. Gradually Brit. bombing reinterpreted the limitations of international law concerning identifying targets and taking 'reasonable care not to bomb civilians' to the wider conception of bombing 'target areas.' Yet strictly area-bombing is legitimate, the question being, for example in a naval bombardment, whether the incidental destruction of civilian life and property can be justified by the military advantage to the attacking belligerent of the effective destruction or reduction of the enemy's capacity to make war. If, because of intense anti-aircraft fire or other reason, the only way to make sure of putting the objective out of action is to place a pattern of bombs over the area where it is known to be

situated, it is not contrary to international law to bomb that area, whatever the consequences to civilian life. But in any case the Germans could not logically question this or any similar practice. Not long after the change or development of Brit. bombing policy, bombs known as high-duty bombs were brought into use by the R.A.F. To the Germans they were known as block bombs, because they could destroy whole blocks of buildings. They were first used against Emden (31 Mar. 1941) and later with devastating effect on Cologne, Essen, Hamburg, Düsseldorf, and other towns with great industrial areas. Bomber Command's offensive was essentially a night offensive; but occasionally a daylight raid was made by heavy bombers, notably on 17 April 1942, when a score of Lancasters bombed Augsburg; and again on 17 Oct. 1942, when 94 Lancasters made a low-level attack lasting 7 min. on the Schneider armament works at Le Creusot, for the loss of only 1 machine, and that by mischance, there being no opposition. But medium bombers and fighter-bombers were more often used for daylight sweeps into the Low Countries and France. Fighter-bomber machines were also employed in these sweeps.

Technique of concentrated attacks. Brit. bombing policy gradually changed from night-long visitations to much larger and extremely concentrated attacks. The new technique of sharp, short, overwhelming assault was tried out by the R.A.F. on Kassel on 8 Sept. 1941, but the force employed was under 100 machines. The new and almost revolutionary development in the 1000-bomber raids on Cologne and Essen was their brevity in relation to their mass, the whole attack being over before the defences could adjust themselves to meet it. An equally strong attack on Bremen, 2 July 1942, was concentrated into half an hour. There were soon to be, in that year and later, innumerable further illustrations of the damaging effectiveness of these highly concentrated massed raids—blanket attacks leaving nothing untouched within a wide perimeter and overwhelming (as at Düsseldorf, 31 July 1942, and Kiel, 13 Oct. 1942) both guns and searchlights. Moreover a 'round-the-clock' bomber offensive became practicable in 1942, when the Amer. Air Force began its heavy daylight raids on enemy targets, with large formations of Fortress and Liberator aircraft; while the R.A.F. continued its night operations.

Strategic bombing policy justified. R.A.F. raids on Ger. targets in the first months of the war were delayed by the influence on the Allied Command of fears of reprisals. But Brit. bombs fell on the Ger. mainland before Ger. bombs fell on Britain (18 Whitley bombers attacked railway installations in W. Germany, 11 May 1940). This boldness in exploiting strategic bombing was justified, for, in fact, the bomber is a primary instrument for the repression of aggression and would seem to be the only weapon that can, in the long run, destroy

war; for it can smother and stifle war at source, and this was the policy of the Allies in their great bombing raids of 1943-5.

The allied strategic bomber offensive against Germany could not, by itself, win the war, as the effect on production and on civilian morale was over-estimated. One of the most successful targets was Germany's oil industry, and attacks on this, together with an all-out assault on enemy communications, hampered severely both the mobility of the Ger. forces and their supply. In addition, great emphasis was placed on destruction of Ger. fighter aircraft factories, especially by the U.S. daylight bomber forces, which also concentrated on shooting the Luftwaffe from the air by effective cross-fire from the heavily armed bombers and their fighter escort. The intensification of the allied bombing offensive in the last weeks of 1943 and through the early months of 1944 at length forced on the Luftwaffe the dilemma of either coming to grips with the bombers and suffering great losses—a dangerous risk in view of the then impending invasion of W. Europe—or of declining combat and leaving Ger. industry virtually undefended.

As the time for the Normandy landings approached, the allied air forces switched their main effort from Ger. oil plants and aircraft factories to railways and bridges. R.A.F. Coastal Command made new dispositions to meet the potential threat to the allied sea armada from Ger. U-boats and E-boats based on Fr. ports; defensive fighters took special precautions against reconnaissance aircraft; and 'intruder' planes destroyed as many as possible of the Ger. radio-location stations in N. France. On D Day the allied forces' 'sea-ground' services struck at the most vital target of all—the overland route to Berlin. Yet the Luftwaffe failed to appear. The R.A.F. and the Amer. Air Force had made it impossible. Just before allied troops stormed the beaches of Normandy, Amer. heavy bombers and large formations of R.A.F. heavy bombers joined with allied naval forces to smash at beach defences. A few small motor launchers, equipped with lights and radio beacons to guide the airborne troops, took up their positions in the Channel. The airborne troops, operating behind enemy lines, disrupted communications, seized cross-roads, and cut railway lines. The allied air forces bombed bridges over the Loire and the Seine to seal off the Normandy and Brittany battle areas from the rest of France. Largely because of this the enemy was unable to bring up reinforcements to the front. Gen. Patton's lightning drive through France in 1944 was made possible by the tactical support of the air forces, whose fighters and light bombers covered his otherwise unprotected right flank. Again, the incessant battering from the air of flying-bomb launching sites in N. France reduced the weight of the flying-bomb attacks on Britain to one-quarter of what they would have been. The operations of the 15th Air Force

heavy bombers based in Italy were directed mainly against Germany's oil installations, but it was this force that was able to give most direct support to the Russians, who had no strategic air force of their own. The advent of the giant Superfortresses opened up a new chapter in the hist. of air war. They made their first raids on the Jap. homeland in Aug. 1944, and one year later brought the Pacific War to an end by dropping atomic bombs on Hiroshima and Nagasaki. Probably the results already achieved with conventional bombs would have been sufficient to ensure Japan's surrender without the need for an invasion of that country. See PACIFIC CAMPAIGNS IN SECOND WORLD WAR.

Technique of the 'pathfinder' and 'master-bomber.' In Sept. 1942 the 'pathfinder' technique was introduced. The basic principle of this was the employment of flares to light up the target. There were 3 successive phases of flare-dropping during a raid: first, a few aircraft flew ahead of the main body to drop flares to illuminate the general target area; a second wave of raiders dropped further flares over a more concentrated region; then the bombers dropped pink incendiaries over particular targets. That was the method of attack during the winter of 1942, and it represented a general improvement of 20 to 30 per cent in damage. It was then that the Germans began to develop their counter-measures in the way of dummy fires in open country to distract the allied bombers. They also set a network of electric-light globes close to the ground, and by flicking these on suddenly, in combination with arc-lamps, gave an effective impression of falling bombs. They also constructed dummy buildings filled with combustibles and set these on fire when the alarms announced the approach of allied aircraft. But these devices had only a short period of success, for the allied air command developed a new technique, that of the master-bomber. The master-bomber and deputy master-bomber, flying in Lancasters would arrive over the target 15 min. ahead of the main body, and drop a 250-lb. or 500-lb. bomb, which, exploding 300 ft. above ground, would emit a series of flares well above the level that could be reached by the normal 'fake conflagrations.' If the ground was not visible the process known as sky-marking would be adopted, and flares dropped over the target above cloud level. The main body would then bomb the area indicated by these flares. The development of new radio and radar navigation and bomb-aiming equipment greatly improved bombing accuracy.

Air strategy to-day. With the advent of even more powerful atomic and hydrogen bombs, the heavy bomber forces of America, Russia, and Britain remain a deterrent to future major wars. Local wars, such as the Korean campaign, follow the same general pattern as the Second World War; but all current ideas on strategy may be changed by the

perfection of long-range nuclear war-rockets, against which no defence yet seems possible. See also BRITAIN, BATTLE OF; Bomber; Fighter; Naval Operations in Second World War.

Ærø, Dan. is. off the E. coast of Slesvig, Baltic Sea, S. of the is. of Fyn. The surface is flat, but the soil is productive. **Æroskøbing** in the E. is the chief tn. Area 34 sq. m.; pop. of is. 10,430.

Aerodrome, see AIRFIELD.

Aerodynamics. The science of A. consists of the study of the forces which air can exert on a body, owing either to the motion of the body through the air or to the motion of the air past the body. It finds its most important application in the design and construction of aircraft, and the word A. is now generally used to refer to the mechanics of flight. In this sense the subject deals with (a) the origin and nature of the air forces experienced by an aircraft, and (b) the effect of these forces on the behaviour of the aircraft. A knowledge of A. is therefore essential for the determination of such important items as the strength of the structure, the capability of the aircraft to carry its load, and the degree of stability and controllability.

In so far as A. deals with (a) above it cannot be regarded as an exact science, for many of the air forces acting on an aircraft are not directly calculable from first principles, but have to be determined by experiment. Most of the experimental work is carried out on models, and in this work advantage is taken of the fact that the air forces are the same, whether the model is moving through still air or is stationary and the air is flowing past it, provided that the relative speed is the same in each case. The model is therefore kept at rest and mounted in a long box of circular or square cross-section, called a wind channel or wind tunnel, and the air is driven through the channel by the action of a propeller or jet propulsion system. In this way the air forces can be simply and accurately measured.

The fundamental law of A. states that, for all geometrically similar bodies inclined at the same angle to the air stream, the air force experienced may be taken with good accuracy to be directly proportional to the density of the air, the square of some linear dimension, and the square of the speed; and it is by the use of this law that data obtained from model experiments can be applied to the full-scale aircraft. Suppose, for instance, the full-scale resistance at 100 m.p.h. is to be deduced from the measured resistance of a $\frac{1}{10}$ -scale model at 50 m.p.h., the air density being the same in each case. Then, since every dimension of the full-scale aircraft is 10 times the corresponding dimension of the model, the measured resistance must be multiplied by 10^3 or 100 to allow for scale. Again, since the full-scale speed is double the model speed, the measured resistance must also be multiplied by 2^2 or 4. Thus the full-scale resistance at 100 m.p.h. is 400 times that of the model at 50 m.p.h.

Near the ground density variation is negligible, but the decrease of density at height is most important. For instance, the density at about 18,000 ft is only one-half that at ground level, and so the resistance at this height is halved also.

Although A. still depends to a great extent upon experiment, the mathematical theory of airflow has not been neglected, and modern research has thrown considerable light on the true working conditions of such important aircraft components as airscrews and aeroplane wings. Applied A. is now, in fact, a blend of theory and experiment, and it is possible to predict most air forces with considerable accuracy, except in the transonic region, where the turbulence and shock waves associated with airflow at the speed of sound (see SUPERSONIC SPEEDS) interfere with the natural order of wind tunnel or mathematical calculations. With this important exception, when all the air forces on an aircraft are known, A. fulfils its function with regard to (b) above by the application of the more exact principles of ordinary mechanics. See also AEROPANE. See A. C. Kermode, *Flight without Formulae*, 1951; R. C. Pankhurst and D. W. Holder, *Wind Tunnel Technique*, 1952; *Flight Handbook*, 1954; K. D. Wood, *Technical Aerodynamics* (3rd ed.), 1955; E. A. Bonney and others, *Aerodynamics, Propulsion, Structures, and Design Practice*, 1956.

Aero-Engines. There are 3 main types: reciprocating (Otto or Diesel cycles, i.e. normal internal-combustion engine with electric ignition, or solid-injection internal-combustion engine, q.v.); turbine; and rocket—the 2 latter appearing during the Second World War.

The essential requirement is high power for low weight. In the *reciprocating internal-combustion engine* this is achieved by attention to detail design, by the use of special materials and the careful machining of components, and by supercharging to obtain the highest possible power for cylinder vol. At the end of the First World War, dry weight was approximately 5 lb./h.p.; now it is only about 1 lb./h.p. Carburetion is complicated by the small amount of oxygen in the rarefied air at heights, which reduces the quantity of fuel that can be used and consequently the power of the engine. On small engines, i.e. up to 200 h.p., the effect on the fuel/air ratio is counteracted by an altitude control which reduces the fuel delivered at a given throttle setting; but this method only keeps the engine running, it does not maintain the power output at its sea-level figure. To maintain power superchargers (see INTERNAL-COMBUSTION ENGINE) are fitted. In Great Britain an automatic boost control is fitted to the carburettor (q.v.) so that the engine is not damaged by opening the throttle too much, and obtaining too great a power at a given altitude. The automatic boost control is a device, operated initially by a variant of the ordinary barometer, which overrides the normal throttle in such a way that the maximum quantity

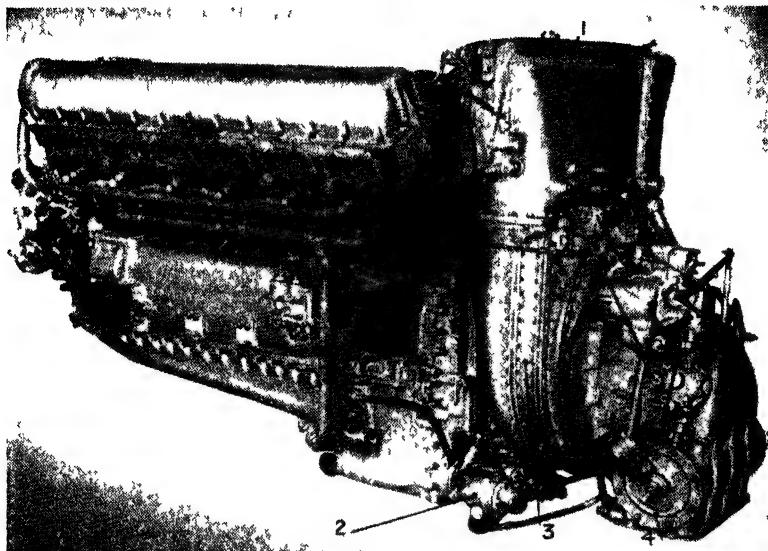


FIG. 1. LIQUID-COOLED POPPET-VALVE VEE
Rolls-Royce Griffon 130 with 3-speed supercharger. Weight 2100 lb.

Maximum powers:

- 2400 b.h.p. at 5000 ft
- 2250 b.h.p. at 14,500 ft
- 2050 b.h.p. at 22,000 ft

- 1. Intercooler
- 2. Fuel metering pump replacing carburettor
- 3. Three-speed supercharger
- 4. Air intake and throttle

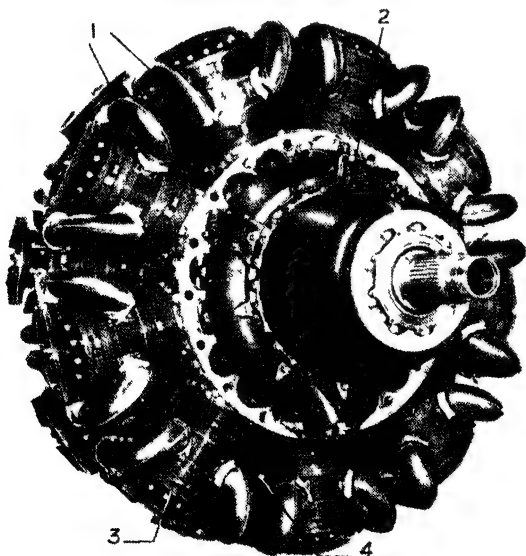


FIG. 2.

AIR-COOLED SLEEVE-VALVE RADIAL

Bristol Centaurus XI,
2-speed supercharger

Weight 2695 lb.
Diameter 55.3 in.

Maximum powers: 2520
b.h.p. at 1000 ft at
2700 r.p.m. lower,
2225 b.h.p. at 11,000 ft
at 2700 r.p.m.

- 1. Exhaust pipes
- 2. Epicyclic gearbox
- 3. Finned sleeve valve cylinder
- 4. Intercylinder baffles

of fuel admitted at any air pressure will not cause an explosion in the cylinders that will overload them. Freezing is another serious problem, which has to be overcome by having alternative heated air-intakes, by using injection carburetors (U.S. method adopted in Great Britain about 1943) where the fuel is squirted into the induction manifold instead of being sucked off a jet in a venturi, or by direct injection through nozzles in each cylinder (Ger. system). Owing to high power (largest piston engine 3800 h.p.) cooling is important. Air-cooled engines dissipate heat through fins on the

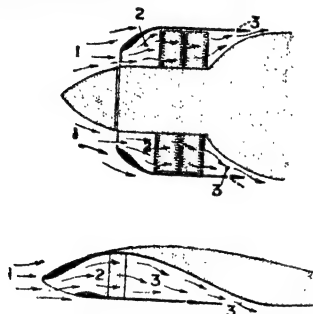


FIG. 3. DIAGRAMMATIC SKETCHES OF THE PRINCIPLES OF PRESSURE COOLING APPLIED TO AN AIR-COOLED RADIAL ENGINE AND A DUCTED RADIATOR

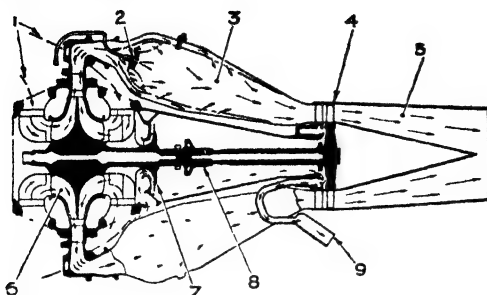
1. Air enters small opening in cowling at high speed.
2. Air expands inside cowling; speed drops and pressure rises.
3. Air heated by cooling engine expands further and is ejected through small outlet at high speed. Volume of air is controlled by varying size of outlet.

cylinders and are assisted by ducted cowlings (Fig. 3) which pass air round the cylinders without increasing drag. Liquid-cooled engines use a glycol/water mixture with a high boiling point, and the radiators are mounted in ducts (Fig. 3) where the air is passed through at low pressure and then ejected through a narrow outlet—giving thrust, not drag, at high speed.

Reciprocating engines (R.E.) can be classified as follows: *Otto cycle*: air-cooled radials, 3, 5, 7, 9, or combinations up to 4 rows of 7, cylinders: power 50–3800 h.p. (Fig. 2); air-cooled in-line or vee, 4, 6, 12 cylinders: power 50–500 h.p.; air-cooled horizontally opposed, 2, 4, 6, 8 cylinders: power 50–350 h.p.; liquid-cooled vee, 12 cylinders: power 1000–3000 h.p. (Fig. 1); liquid-cooled H. (Napier), 2 sets of 12 horizontally opposed cylinders driving separate crankshafts geared together: power 3000 h.p. *Diesel cycle*: not generally successful owing to weight, but low fuel consumption an advantage for long range; only really successful example Ger. Jumo 205 liquid-cooled, vertically opposed 2-stroke.

The *gas turbine engine* (T.E.) has only been practicable since 1939, its use depending largely on the development of heat-resisting alloys for the turbine. The gas turbine differs from the steam turbine (q.v.) at present, since it consists of a single or at most 3 turbine wheels instead of the sequence of wheels (or drum) that are used in the steam design. This is because it is only necessary to extract sufficient energy from the combustion gases to drive the air compressor; in fact it is the residual energy left in the fast-flowing gases which provides the thrust or power of the engine. There are 2 main principles: that of Sir Frank Whittle with a centrifugal compressor (Fig. 4), and the axial compressor type (Fig. 5). The basic principle of each is the same, viz. air taken in at the front is compressed, then expanded by burning fuel with it and ejected at high speed. Fuel/air ratio is adjusted for altitude by a capsule-operated barostat—this is a barometric device, similar to a boost control, that adjusts the fuel/air mixture to the correct combustion proportions for the varying air densities at different heights. T.E.s have a very simple cycle and the torque is small owing to the low weight of revolving parts, and the whole unit is very light for its power—this cannot be easily compared with R.E. since it is measured as lb. thrust, not as h.p. T.E. delivers its power by the jet of heated air expelled at the rear, the thrust being the reaction to the mass of air ejected. Efficiency depends on ratio of forward motion of engine to backward flow of jet, 100 per cent being when the speeds are equal. This engine is most effective at high speeds (500 m.p.h. plus), and at lower speeds it is more efficient to convert the s.h.p. of the turbine to thrust by gearing it to an airscrew. In this case the greater part of the energy in the gases is usually absorbed by the turbine. It can be converted into airscrew thrust by gearing direct from the compressor shaft, or, more efficiently, by taking the power from a separate turbine stage (Fig. 6). T.E.s are notable for running at high speeds, 10,000–15,000 r.p.m. as against the 3000 r.p.m. of a R.E.; but since the rotating masses are light, stresses are lower than in R.E. and the resulting engine is very light. Simplest jet engines are ramjets or athodyds (Fig. 7), consisting of a form of venturi in which fuel is burnt with the air taken in the front by forward speed; the gas is expanded by heating and is ejected with increased energy. This system requires the engine to be given initial forward speed to provide the initial air compression before the cycle comes into operation—at very high speeds it is efficient. Main disadvantage of all jet engines is high fuel consumption, due mainly to the high powers and to inefficient operation of the cycle at cruising and idling speeds. This difficulty is being overcome rapidly by refinement in design.

Rocket engines were developed by Germany in the Second World War, and are driven by liquid propellants which are



1. Intake air
2. Fuel nozzle
3. Combustion chamber
4. Turbine wheel
5. Jet pipe
6. Centrifugal compressor
7. Turbine cooling air fan
8. Main shaft
9. Turbine cooling air outlet

Weight 1600 lb.
 Diameter 49.5 in.
 Length 97 in.
 Maximum power:
 Static thrust 5000
 lb. at 12,400 r.p.m.
 at sea level

1. Jet pipe
2. Combustion chamber
3. } Air intakes
4. } Accessories
5. Accessories
6. Turbine housing
7. Fuel gallery

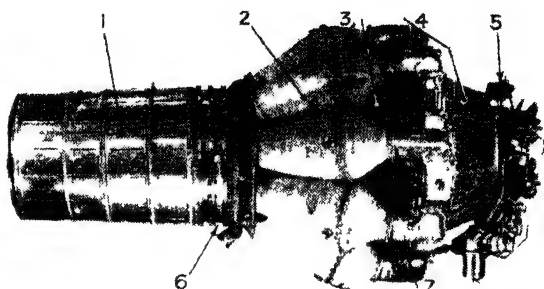
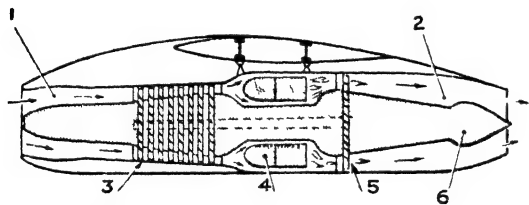


FIG. 4. WHITTLE-TYPE JET ENGINE
 Rolls Royce Nene I with double-sided centrifugal compressor.



1. Air intake
2. Hot air exit
3. Eight-stage compressor
4. Ring of burners
5. Turbine
6. Outlet control

Weight 1350 lb.
 Diameter 27 in.
 Length 134 in.
 Maximum power:
 Static thrust 1760
 lb. at 9500 r.p.m.
 at sea level

1. Oil tank and cooler
2. Accessories
3. Fuel gallery
4. Turbine housing
5. Outlet control
6. Intake duct
7. Compressor stage
8. Combustion chamber
9. Jet pipe

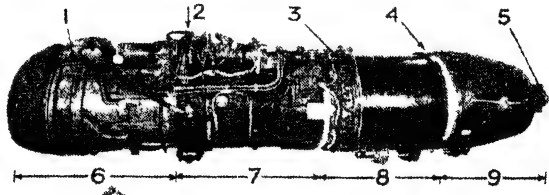
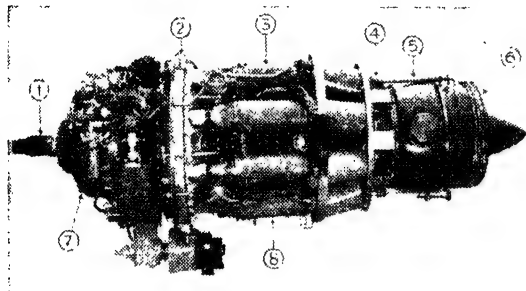


FIG. 5. AXIAL JET ENGINE
 B.M.W. 003 E-1 with straight-through combustion

pumped into a combustion chamber where they form a very powerful propellant. Rockets give very high powers, but only for short periods, because the fuel consumption is large, since the engine provides its own oxygen instead of using that in the air—this latter fact makes them independent of the earth's atmosphere. See also JET PROPULSION. See A. W. Judge, *Aircraft Engines*, vol. 1, 1945; vol.

at the Natural Hist. Museum in S. Kensington.

Aeronautics, the whole field covering airborne vehicles, basically divided into aerostation (lighter-than-air flight) and aviation (heavier-than-air flight). There is some question as to whether rocketry and astronautics (space flight) come properly within the sphere of A. Historically aviation is the older of the two,



The Bristol Aeroplane Company Ltd

1. Propeller shaft
2. Centrifugal-flow compressor casing
3. Combustion chambers

4. Air intake
5. Turbine casing
6. Jet outlet
7. Reduction gear casing

FIG. 6.
TURBOPROP ENGINE

Bristol Proteus 755, with twelve axial and one centrifugal stages of compression and two separate two-stage turbines, one driving the compressor and one the propeller.

Weight: 2850 lb.

Maximum power: 3650 s.h.p. plus 1220 lb. jet thrust (= 4120 equivalent h.p.) at about 11,100 r.p.m.

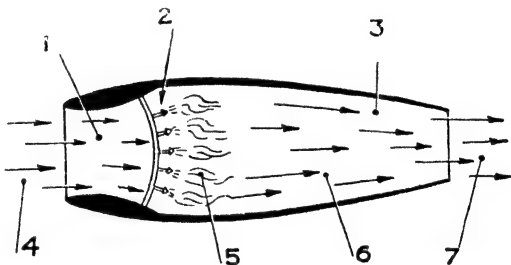
8. Axial-flow compressor casing under combustion chambers

FIG. 7.

PRINCIPLE OF ATHODYD

The basic principle is the same as Figs. 4, 5. Air taken in at the front is compressed, then expanded by burning fuel with it and ejected at high speed.

1. Venturi
2. Fuel nozzles
3. Short jet pipe
4. Air entering at high speed
5. Burning gases
6. Expanded hot gases
7. High velocity jet



il, 1947; R. A. Beaumont, *Aero-Engines for Students, including Gas Turbines*, 1947; G. Geoffrey Smith, *Gas Turbines and Jet Propulsion*, 1955; Northrop Aeronautical Institute, *Aircraft Power Plants*, 1955.

Aerolite, mass of stony or metallic matter known to have fallen to the surface of the earth from beyond the region of the atmosphere. Sometimes a distinction is drawn between A.s and meteorites, the latter being taken as the generic term and the former applied to those masses which are composed of stony matter only (see METEOR and METEORITES).

Masses of meteoric stone have been found weighing as much as 50 tons, but the largest actually seen to fall came down in Hungary in 1866 and weighed 547 lb. A collection of A.s may be seen

since, if we go back to mythology, we find the stories of Pegasus and later of Daedalus. Further, the monsters of Assyrian and Egyptian mythology give us examples of beasts that were supposed to be able to fly. During the Middle Ages and down until the beginning of the 18th cent. we get story after story of men fitted with artificial wings, either making or attempting to make flights. We have, for example, the story given us by Wm Dunbar, the poet, of how an It. magician gave an exhibition of flying for the edification of James IV. He purposed to fly from the walls of Stirling Castle, armed with wings which were composed chiefly of birds' feathers. Naturally he failed, being fortunate enough to escape with only a broken thigh, his explanation of his failure apparently being that his wings

were not made of eagles' feathers, but of those of the lesser birds of the sky. We have further references to the art of flying in Leonardo da Vinci and in Francis Bacon, and later still we find an attempt to prove that flight by means of man's own strength was impossible, this being argued chiefly from a detailed examination of the muscular strength of birds. The first science, however, to be more or less successful was aerostation. In the classics we get one reference which gives us an idea that the later method of aerostation by means of hot air was known to the ancients, this reference being to the dying dove of Achytas; but for a further development of this method we have to come down to medieval times. Roger Bacon (1214-94) speaks of attempting by means of a hollow globe and liquid fire to solve the problem, while in the following cent. he is followed by Albert of Saxony (fl. 1366-90), who also spoke of aerostation by means of fire in a light sphere. During the 16th and 17th cents., however, we get a number of fantastic ideas put forward. Laurus, for example, spoke of swans' eggs filled with sulphur or mercury being drawn up to the sun, while in the *Histoire comique* of Cyrano de Bergerac vessels filled with morning dew are supposed to have carried a man into the middle of the atmosphere. But also in the 17th cent. we get the beginning of much better ideas. Francis Lana came forward in 1670 with an idea which, though practically unserviceable, was nevertheless a great advance on previous ideas. He proposed that 4 hollow balls should be taken, made of brass of the very slightest thickness, and that these should be exhausted of air. To them should be attached a small boat and sail, and in that way a balloon would be contrived which could carry a man. The idea was not feasible, since the globes, made of brass only 1-250th of an in. thick, would have collapsed by reason of their own weight. But although Lana saw this difficulty, he argued that their shape would prevent that. It is not until the next cent. that we get the real balloon invented.

The beginning of the development of the balloon was the work of 2 brothers, Joseph and Etienne Montgolfier (q.v.), who came to the conclusion that a paper bag filled with 'substance of a cloud-like nature' would float in the atmosphere. They made a number of experiments which attracted attention and further efforts from others. Progress was made gradually, and the first man-carrying ascent took place in Oct. 1783, when Pilâtre de Rozier went up in a Montgolfier captive balloon. In Nov. of the same year the first free ascent was made by Rozier and the Marquis d'Arlandes, who made an ascent in a fire balloon. At the beginning of the next year (Feb. 1784) a balloon was liberated from Sandwich, and descended in Fr. Flanders; this was the first cross-Channel flight. The first woman to ascend was Mme Thible, who went up from Lyons in 1784. The first man-carrying cross-Channel voyage was made by Blanchard and Jeffries in

Jan. 1785. Blanchard had already in the previous year estab. a reputation as an aeronaut, and by this and succeeding voyages he became known as one of the most famous.

During the 19th cent. a number of long voyages were made, the 2 longest being voyages of over 1000 m., in 1859 in America, and in 1900 from Paris to Korostyshev, a distance of 1193 m. In 1897 an unsuccessful attempt was made by Andrée (q.v.) to discover the N. Pole from Spitsbergen by balloon.

Between 1850 and the end of the cent. a number of important ascents were made for scientific purposes; the most important of these were the ascents made by Glaisher between 1862 and 1866. The chief problems that these ascents tried to solve were: the height, density, and thickness of clouds, the direction and the rate of the various air currents, the amount of electricity in the air, and the comparison of readings of an aneroid barometer with those of the mercury barometer. The results of the observations were pub. in the Brit. Association reports between 1862 and 1866. A number of extremely high ascents have been made, but these have always been attended with much danger. The highest was made in July 1901, when a height of some distance over 34,500 ft was reached by 2 aeronauts from Berlin. To obviate the necessity of making these dangerous high ascents, unmanned balloons have been sent up with recording instruments attached that work automatically.

From the beginning balloons had attracted the attention of the military authorities, and we hear of their being used during the Napoleonic wars, the Amer. Civil War, and the 1870-1 siege of Paris.

From the time of the beginning of balloon flights it was recognised that the great problem before aeronauts was to be able to navigate the balloon safely through the air. The first means of propulsion tried was oars, but it was recognised that this means could never be really successful. The first attempt to navigate the balloon by means of a small, light engine came over 50 years later, in 1852, the experiment being made by Henri Giffard. From the year 1897 the development of the airship was the special work of Count Zeppelin (q.v.). In 1900 he made his first flight with a dirigible balloon which carried 5 men. It was made of aluminium, supported by gas-bags, and driven by 2 motors, each about 16 h.p. His first experiment met with some success, but the first Zeppelin airship was succeeded by another in 1905 with greater motor power; this was wrecked and was succeeded by a third which met with great success. This airship carried 11 passengers and attained a speed of about 36 m.p.h. The fourth Zeppelin airship succeeded in travelling about 250 m. in 11 hrs, but was wrecked by a storm in 1908, the wreckage catching fire and completely destroying the ship. In the meantime many other experiments had been carried out, notably by Santos Dumont (q.v.), who circled the Eiffel

Tower in the face of a fresh wind; while in England a number of experiments were carried out by the War Office with dirigible balloons. The most successful voyage was that of the *Nulli Secundus*, which, leaving Farnborough, sailed round St Paul's to the Crystal Palace, carrying 2 passengers and attaining a speed of about 20 m.p.h. See also AIRSHIPS and BALLOONS.

Aviation. During the latter part of the 17th cent. and the beginning of the 18th many theories were advanced and much research made concerning the theory of flight. Much experiment was done with artificial wings and with aerial screws. Amongst the names which may be mentioned in this connection are those of Bonelli, Morey, Pettigrew, and Cayley (q.v.). To Sir George Cayley is given the credit of being the inventor of the modern aeroplane. Prof. Berfét, in his book *The Conquest of the Air*, points out that every essential to successful flight was given in the airship invented by Sir George, which was described by its inventor in *Nicholson's Journal* in 1809, and in the following year he produced the apparatus itself—at first without a motor, but later with a motor as well. The invention, however, was not successful, and during the trials the machine met with disaster. The next attempt at aviation that we hear of is in 1842, when Henson, by a combination of aerial screws and supporting surface, tried to complete a successful machine. The attempt was not a success, although it was followed up in the succeeding years by many other attempts, especially by his partner, Stringfellow. During the years which followed many efforts to solve the problem of aerial flight were made, but none of them met with great success. The difficulties in the way were enormous: the science of aerodynamics had yet to be developed; flight in the air was flight through a substance the laws of which were only dimly beginning to be understood. The science of aerodynamics, which even now is only at its beginning, was developed during the latter part of the 19th cent. by Sir Hiram Maxim and Prof. Langley, an Amer. physicist. By 1896 experiments of Langley had been so successful that he made a model aeroplane which, although it did not by its own effort lift itself from the ground, flew for a distance of about half a m. along the Potomac R. Further experiments had in the meantime been carried out by Sir Hiram Maxim and M. C. Ader. The former to a very great extent helped to solve the problem of light motors by producing in 1894 an aeroplane with an engine which weighed not quite 2 lb. per 1 h.p. But in spite of this the aeroplane failed to fly. Ader seems to have been the first inventor to produce a machine which lifted itself from the earth by its own effort. Between 1890 and 1902 he produced 3 machines, none of which was very successful, but which embodied new ideas, and one of which flew for about 350 yds. The first aeroplane flight may be said to have taken place at Satory in 1896, when Ader's

machine lifted itself by its own power and flew for the short distance already mentioned. In the meantime experiments were being made with soaring machines and gliders, chiefly by Otto Lillenthal (q.v.), who, with an arrangement formed on the plan of birds' wings, attempted to imitate their 'soaring flight.' These wings were made of a light framework covered with a light fabric, with 2 rudders in the rear. In the centre of this framework Lillenthal was poised, and with an apparatus of this description he made over 2000 flights in safety. He broke his neck while using a biplane glider, falling from a height of about 80 metres. These experiments were further carried out by Chanute in New York and by the brothers Wright (q.v.). They followed up the ideas which had already been promulgated by Lillenthal and Chanute. The result of these experiments was that in 1903 the brothers Wright produced their first aeroplane. The first invention of the Wrights was simply an aeroplane that flew in a straight line, but this received many modifications; and in 1908 they came to France to carry on experiments, during which Wilbur Wright created a record by remaining in the air for over an hour while carrying a passenger. He also attained a speed of 60 kilometres an hour. During this period, however, great strides had been made by many other inventors. Farman had succeeded in producing a machine with which he remained in the air for nearly 45 min., and he was closely followed, and sometimes surpassed, by the Frenchman Léon Delagrè. The best results, however, were undoubtedly attained by the brothers Wright, who succeeded in remaining in the air for nearly 2½ hrs. The year 1909 may be taken as the real era of the beginning of successful aviation. In that year records were made only to be broken, and the ultimate success of the monoplane and biplane was proved by many successful experiments. On 25 July 1909 Blériot flew the Channel in a monoplane, but in the same year Farman covered a distance of nearly 140 m. in 4 hrs in a biplane. Between 1890 and 1908 the best distances flown were 164 ft by Clément Ader in France in 1890; 852 ft in 1903, 20½ m. in 1905, and 50 m. 1638 yds in 1908, all by Orville Wright in the U.S.A. For details of later technical development see AEROPLANE.

Compared with the First World War period and after, progress was relatively slow in the 5 years preceding that war. Up to that time the chief international records were: *duration*, 24 hrs 10 min. by Boehm (Ger.) in an Albatros biplane, 1914; *distance* (over circuit without alighting), 1200 m. by Landmann (Ger.) in an Albatros biplane, 1914; *distance* (in straight line without alighting), 486.87 m. by Deroye (It.) in a Blériot monoplane, 1913; *altitude*, 25,750 ft by Oelrich (Ger.) in a D.F.W. biplane, 1914; *speed*, 126.59 m.p.h. by Prevost (Fr.) in a Deperdussin monoplane, 1913. Passenger-carrying records were: *duration*, 19 hrs 47 min.,

9 passengers, pilot Noel (Fr.) in Graham-White biplane, 1914; *distance*, 68.3 m., 6 passengers, pilot Garaix (Fr.) in Schmitt biplane, 1914; *altitude*, 980 ft., 15 passengers, pilot Sikorsky (Russian) in Sikorsky biplane, 1914; *speed*, 66-85 m.p.h., 6 passengers, pilot Garaix in Schmitt biplane, 1914; *flying over sea*, 320 m., Cruden Bay (Scotland) to Kleppe (Norway), pilot Gran (Norwegian) in Blériot monoplane, 1914. Garros in Sept. 1913 flew 700 m. across the Mediterranean, but passed over Sardinia en route. Among the best Brit. flights of those years were 107 m. 1320 yds in 3 hrs 12 min. 40 sec. by T. Sopwith and 185 m. 810 yds in 4 hrs 47 min. by S. F. Cody, both in 1910. These pioneer records, if valuable, look unimpressive today. The First World War (see also AERIAL WARFARE) gave a great impetus to A. in all its branches, and progress during that period was directed along the lines of military necessity.

The transition of both heavier-than-air machines and dirigibles from the experimental stage to the practical, judged by the low percentage of accidents as compared with other modes of transport, by the immense distances flown without a stop, and by the regular use of air routes involving the carriage of more than 100,000 passengers annually (in Brit. aircraft) over a total distance of more than 1,000,000 m., was complete many years ago. A further indication of the progress made was afforded by the existence of national and international laws for the regulation of civil aviation, the creation of air ministries, and the establishment of aerodromes in all countries. The increasing reliability of heavier-than-air machines was shown by the long distances and spectacular flights of recent years. The most remarkable oceanic flight was the lone venture of Capt. Charles D. Lindbergh, U.S.A., in flying from New York to Paris in the *Spirit of St Louis* (see ATLANTIC FLIGHTS). Subsequent to Lindbergh's flight (3000 m. in 33 hrs) there were 12 flights across the Atlantic from W. to E., but there was no solo flight until that of the late Miss Amelia Earhart, who, in 1932, flew from Newfoundland to Ireland (2026½ m. in 13 hrs 30 min.). In 1933 Wiley Post flew from New York to Berlin (4000 m. in 26 hrs) and, concluding the journey to New York via Siberia, thus made the first solo flight round the world (16,500 m.). The first E. to W. transatlantic solo flight was made by J. A. Mollison in 1932 in a Puss Moth machine from near Dublin to New Brunswick (2400 m. in 30½ hrs). Mollison and Amy Johnson flew the Atlantic together from Pendine in Wales to Bridgeport, U.S.A., via Canada, in the same year, this being the first flight from Britain to the U.S.A.

The first flight to Australia was that made by the brothers Ross and Keith Smith and crew in 1919. Sir Alan Cobham flew there and back (28,000 m.) in 1926. Two years later Capt. Herbert Hinkler of Australia flew from Croydon to Port Darwin (10,340 m.) in 15½ days at

an average speed of 95 m.p.h., stopping at various large towns at intervals of between 400 and 900 m.; but in 1930 Sir Charles (then W./Cdr) Kingsford-Smith made the same journey in about 10 days. In 1930 Amy Johnson, in a Gipsy Moth, set up a record for a solo flight from London to India and, continuing her journey, reached Port Darwin in 19 days, having covered in all 9960 m. Several outstanding record flights followed, the most sensational being in 1934 when C. W. A. Scott, with T. Campbell Black, won the 'Mac Robertson' international air race from England to Australia. This race started from Mildenhall (Suffolk) on 20 Oct. 1934, and the 2 men, flying a de Havilland Comet, reached Melbourne on 23 Oct., their time being 70 hrs 54 min. 18 sec., but the handicap prize was awarded to the winners of the second place, Parmenter and N. Moll, flying a K.L.M. liner with passengers and mail, whose time was 90 hrs 13 min. 36 sec.

A successful trans-Pacific journey was that of Kingsford-Smith, pilot, and C. T. Ulm, relief pilot, with H. W. Lyon, navigator, and I. Warner, radio-operator, both of U.S.A., in a triple-motor monoplane. They flew from California to Honolulu, Fiji, and on to Melbourne, 7800 m., in 3 days 16 hrs, the features of the flight being accuracy of navigation and continuity of wireless communication.

The first Cape Town flight from England was that made by P. van Ryneveld and C. J. Quintin Brand in 1920. Next was a return journey by Alan Cobham in 1925 (a distance of 17,000 m.). J. A. Mollison flew from England in 4 days 17 hrs 19 min. in 1932, but this record was soon beaten by Amy Johnson, who flew from Lympne to the Cape in 4 days 6 hrs 54 min. In the same year 2 Fr. airmen, Goulette and Salel, flew from Le Bourget to Cape Town in 91 hrs.

In Polar regions Capt. Hubert Wilkins, the explorer, flew from Alaska to Spitzbergen (20,000 m.) in a monoplane with a Wasp engine, to demonstrate the superiority of the plane over the dirigible for Arctic flights. In 1926 Rear-Adm. Byrd, U.S. Navy, accompanied by Pilot Floyd Bennett, flew from King's Bay, Amsterdam Is., direct to the N. Pole, and back to his starting point—a total distance of 1600 m. in under 16 hrs. The same aviator also flew over the S. Pole.

In these days air records do not stand long unbeaten; but we may note the following aviation records and performances: a non-stop flight in 1929 from England to India (4130 m.) by Sqdn-Ldr A. G. Jones-Williams and Fl./Lt. N. H. Jenkins in an R.A.F. monoplane, taking 50 hrs 38 min.; by Capt. C. D. Barnard and the Duchess of Bedford, from Lympne to Karachi and back to Croydon in 7½ days, in 1929. The U.S. Army monoplane flight of 1929, lasting 150 hrs, was remarkable for the feat of refuelling in the air. In 1933 Sqdn-Ldr O. G. Gayford and Fl./Lt. G. E. Nicholson made a non-stop flight from Cranwell to Walvis Bay, 5309 m., in 57 hrs 25 min. in a Fairey (Napier) monoplane, while in the

same year P. Codos and M. Rossi flew from New York across the Atlantic to Syria, 5637 m., in 54 hrs 44 min. Two Lt. squadrons of flying-boats, consisting of 25 Savoia-Marchetti S.55 seaplanes, carried out a flight in formation to New York, via Holland, Iceland, Greenland, Labrador, and Montreal, covering in all 11,770 m., in 42 days, all but 2 machines returning. Jean Batten flew across the S. Atlantic from Dakar to Brazil in 13 hrs 15 min. (1935); in 1936 Mrs Markham made the first solo flight by a woman across the N. Atlantic from E. to W., flying from England to Cape Breton; Jean Batten, solo flight from Britain to New Zealand in 11 days 56 min. (1936), the first recorded direct flight, while in the following year she flew from Australia to Britain in 5 days 21 hrs 3 min.; J. A. Mollison, Newfoundland to Croydon in 13 hrs 17 min. (1936); Inuwa and Tsukagoshi, from Tokyo to Croydon, 94 hrs 18 min., a distance of 10,000 m. (1937); Merrill and Lambie (U.S.A.), Atlantic double crossing from Brooklyn to England (Sussex), 20 hrs 31 min., and from Southport (Lancs) to Quiney, Massachusetts, in 22 hrs 27 min. (1937); Gremov, Yumashev, and Danilin (Soviet), from Moscow over the N. Pole to California (6700 m.), being the record non-stop flight up to that year, in 2 days 14 hrs (1937); F/O. Clouston, R.A.F., and Mrs Kirby Green, from Croydon to Cape Town, 6870 m., in 1 day 21 hrs 6 min., and back to Croydon, 7135 m., in 2 days 9 hrs 23 min. (1937); F/O. Clouston and V. Ricketts, England to New Zealand, in 4 days 7 hrs 8 min., and back, the whole journey taking 10 days 21 hrs (1938); Mile Elizabeth Lion (France) flew from Istres to Basra, 7500 m., this being the longest flight by a woman (1938); Howard Hughes (U.S.A.) and 4 companions made a round journey from New York, via Paris, Siberia, Alaska, and Canada, to New York in 3 days 19 hrs 17 min. (1938). The long-distance record was held prior by the R.A.F. with the flight of 3 Vickers Wellesley bombers from Ismailia to Australia (Nov. 1938). L.2638 and L.2680 reached Darwin in about 48 hrs and L.2639, which had refuelled at Koepang, followed some 3½ hrs later, the non-stop distances flown being 7162 and 6600 m. A long-distance record of 11,229 m. was estab. by a U.S. Navy crew which flew non-stop from Perth, Australia, to Columbus, Ohio, in 1940. On 29 May 1947 a B.S.A.A. Lancaster flew to Bermuda in 20 hrs, refuelling in mid air. The first transatlantic automatic flight was made (21-2 Sept. 1947) by a pilotless U.S. Army Skymaster from Newfoundland to Britain. In 1949 a U.S.A.F. Superfortress bomber flew round the world non-stop, refuelling four times in mid air *en route*.

Speed records: The Schneider trophy (q.v.) contest has produced high speed records: 318.62 m.p.h., at Venice on 30 Mar. 1928, by Maj. Mario de Bernardi; 328.63 m.p.h., over the Solent on 7 Sept. 1929, by F/O. Waghorn (R.A.F.). On a Supermarine Rolls-Royce S 6 Sqn-Ldr

A. H. Orlebar set up, also in 1929, at Calshot, a world's record for 3 kilometres, averaging 355.8 m.p.h. This, however, was exceeded in 1931 by Fl/Lt. G. H. Stainforth, who averaged 388.67 m.p.h. at Lee-on-Solent, his fastest circuit being 408.288 m.p.h. The Schneider trophy contests ended in 1931, when Britain won the trophy outright. At Augsburg, in April 1939, a Messerschmitt 109 set up a record of 469.2 m.p.h. This last record was unbeaten for 6 years, when, on 7 Nov. 1945, 2 Meteor jet-propelled aircraft both averaged over 600 m.p.h.; Gr.-Capt. W. J. Wilson averaged 606 m.p.h. and Mr Eric Greenwood 603 m.p.h. Cdr Turner Caldwell, U.S. Navy, achieved an average speed of 640.7 m.p.h. over a 1.86-m. course in California, the highest speed reached being 653.4 m.p.h., on 21 Aug. 1947. Since then the record has been raised many times, the first over 1000 m.p.h. performance being by Mr Peter Twiss, who achieved 1132 m.p.h. in a Fairey Delta 2 in March 1956. An unofficial 'record' speed of 2026 m.p.h. has been achieved by an Amer. Bell X 2 research aircraft.

Altitude records: Fl/Lt. M. J. Adam, 53,937 ft. in 1938; Lt.-Col. Mario Pezzi (Italy), 56,017 ft. in 1938; Mr John Cunningham, 59,492 ft. in 1948; W./Cdr Gibb, 65,876 ft. in 1956; M. Randrup, 70,000 ft. in 1957.

Airship flights, etc. The *Graf Zeppelin* left Friedrichshafen on 11 Oct. 1928, and reached Lakehurst, New Jersey, in 11¼ hrs (return journey took 71 hrs), covering 6300 m., and going via France, Gibraltar, Funchal, the Azores, and Virginia. The commander was Dr Hugo Eckener, the designer, and with him was a crew of 40. The flight was successful despite storms, wind, and fog, and from the time taken indicates a considerable advance since 1919, when the Brit. dirigible R34 flew from E. Fortune, Scotland, to Mincola, New York, 3130 m., in 108 hrs. The only other crossings were in 1924 by the *Los Angeles* from Lake Constance, in somewhat better time, and by the Brit. airship *R100*, which flew from England to Montreal in Aug. 1930, taking about 5 days. The *Graf Zeppelin* was flown round the world in 1929, taking 21 days and reaching Lakehurst 29 Aug., and also in 1930. The loss of the Brit. airship *R101* in 1930 and of the Amer. airship *Akron* in 1933 has hardened public opinion against the continued construction of airships (q.v.).

A remarkable experiment, but only partly successful, was that of Juan de la Cierva, who in 1928 crossed the Channel in an autogiro at a speed of 90 m.p.h. and toured England for 3000 m. This machine was wrecked a few days later, owing, it seems, to a broken landing cable rather than to any structural defect (see *AUTOGIRO*).

In commercial development it is probable that the U.S.A. is ahead of Great Britain, in that the aeronautical industry has so far secured the co-operation of the banking and financial interests as to have

emerged from the subsidised or dependent state to that of an industry supported by the public as a whole. In this connection the trustees of the Daniel Guggenheim Fund, created to assist commercial aviation and to stimulate public interest in its development, are now able to concentrate on aerodynamics and cognate problems. (For designs of and developments in aeroplanes see AERO-ENGINES and AEROPLANE; for progress in theories of viscosity and allied topics see AERODYNAMICS.) See also AERIAL NAVIGATION; AEROPLANE; AIRSHIP; AIR MAIL; ATLANTIC FLIGHTS; AVIATION, CIVIL; BALLOON; ROCKETS and SPACE TRAVEL; ROTATING WING AIRCRAFT; SCHNEIDER TROPHY.

See J. E. Hodgson, *The History of Aeronautics in Great Britain*, 1924; C. H. Gibbs-Smith, *A History of Flying*, 1953; John W. R. Taylor, *Picture History of Flight*, 1955.

Aerophor, musical appliance for enabling a wind-instrument player to sustain his notes *ad infinitum*, invented by Bernard Samuels, flautist in the Duke of Mecklenburg-Schwerin's orchestra. It consists of a small bellows worked by the foot, with rubber tubing attached, ending in a metal reed fixed near the mouthpiece of the instrument played. The air from the player's lungs is prevented from passing into the bellows by a stopcock in the tubing. It was first used in Richard Strauss's *Festliches Präludium*, written for the opening of the Concert House, Vienna, 1913.

Aeroplane, any heavier-than-air winged aircraft. The earliest ideas about human flight derived from bird flight, and flapping-wing aircraft (ornithopters) have given rise to popular but unproductive designs since Leonardo da Vinci treated the matter seriously (c. 1500). No full-sized ornithopter has ever flown, but numerous models made in the 19th cent. and later have flown. The first successful heavier-than-air machine in model form was the helicopter toy (or Chinese top) which is described in the article ROTATING WING AIRCRAFT (q.v.), but at the end of the 18th cent. and the beginning of the 19th Sir George Cayley (q.v.) laid the foundations of mechanical flight. The modern A. derives directly from his brilliant work. He defined and investigated the basic problems of aerodynamics and aerostatics, made the first proper A. of hist. (the model glider of 1804), and later made a full-sized glider. Cayley pub. his researches on which subsequent inventors could build. Thereafter the idea of the fixed-wing glider and the powered A. was actively pursued in England and France. Henson's design (1842) gave a great impetus to research, but Stringfellow's model which derived from it (1848) is not now looked upon as successful. The first successful powered model A. was made by Penaud (1871), but vital work in aerodynamics had been pub. by Wenham (1866) and others, especially as a result of the founding of the Aeronautical Society (now Royal) in 1866. Other important designs or flying

models were made by Du Temple (1857), De Louvrie (1865), Moy (1875), Tatin (1879), and Phillips (1893), etc., with Hargrave inventing the box-kite in 1893. Meanwhile the petrol engine was being developed for automobiles and was to become light enough for A.s by the early 1900's. Ingenious but unsuccessful full-size A.s were made by Ader (1890 and 1897), Maxim (1894), and the Amer. Langley (1903), the latter having previously constructed successful steam- and petrol-driven models.

The other great stream of endeavour from which the practical A. finally emerged was gliding, and it was the vital achievements of the German, Otto Lilienthal (q.v.), in 1891-6, that led to valuable work being accomplished by the American Chanute (1896) and the Englishman Pilcher (1895-9), and then to the triumph of the Wright brothers (q.v.). The Wrights first mastered the art of gliding and developed their aerodynamic theories on their three gliders in 1900, 1901, and 1902, and finally built and flew their first engined A. (17 Dec. 1903), when powered, sustained, and controlled flights were made for the first time in hist., near Kitty Hawk, N. Carolina, U.S.A.

The European school of flying derived from Lilienthal, Chanute, Hargrave, and the Wrights, but owing to lack of basic information it was slow to develop, despite the excellent work of Archdeacon (1905), Voisin (1905 onwards), Blériot (1905 onwards), and Delagrange (1907). Technically the first powered A. flights in Europe were made by Santos-Dumont (q.v.) in 1906, but it was the inventors named above who really did the most important work; Voisin and Blériot, and later Levavasseur and Henri Farman, emerged as the outstanding early constructors. The Wright biplane, although talked about earlier, was not seen or flown in Europe until 1908, when its greatly superior qualities made the necessary impact on Fr. and Eng. inventors, and revolutionised aircraft construction. After that aviation made great strides, much aided by better aero-engines, and by 1909-10 the A. had become a practical vehicle. Blériot's flight across the Channel (1909) made a profound impression on the world's govs., and focused attention on the military prospects of the A. By 1914 a large variety of monoplanes and biplanes, landplanes and seaplanes, was in production, with experiments constantly being made in new methods of construction, etc. The First World War had the effect of accelerating every dept of flying, with specially designed machines being produced for various war purposes. During that war engine power increased rapidly, while aerodynamic design did not make great progress beyond the general adoption of the tractor arrangement because of its neater form. The biplane was the most general because it was easier to brace than either the monoplane or the triplane. Generally thin wing sections were used for speed because of their lower drag, although one designer,

Anton Fokker, had realised the possibilities of thick sections which could be used for internally braced cantilever wings.

Immediately after the war a boom in air transport led to the conversion of many of the larger military types, and to the building of some specialised air-liners; but to all intents and purposes the A.S. of the first decade after the war showed little advance on those of 1918— aerodynamically, structurally, or in performance. In 1929 the Brit. Air Ministry radically revised its ideas on military A.S. and the Hawker Hart light bomber and Fury single-seater fighter set a new standard in performance, the former being capable of nearly 200 m.p.h. and the latter

approach 300 m.p.h., the Bristol Blenheim. Up till this time Brit. A.S. had been renowned for their quality and dependability rather than for their performance, but for the next 10 years few other countries produced A.S. as fast as those designed for the R.A.F.

The period 1939-45 saw a somewhat similar development to that in the previous war: i.e. extra speed was gained mainly by adding more and more engine power, culminating in the advent of the jet engine. Outstanding among the A.S. of this period were the Spitfire, whose speed was raised by more than 100 m.p.h. between 1939 and 1945; the Brit. heavily armed, large load-carrying, 4-engined bombers, the Avro Lancaster,

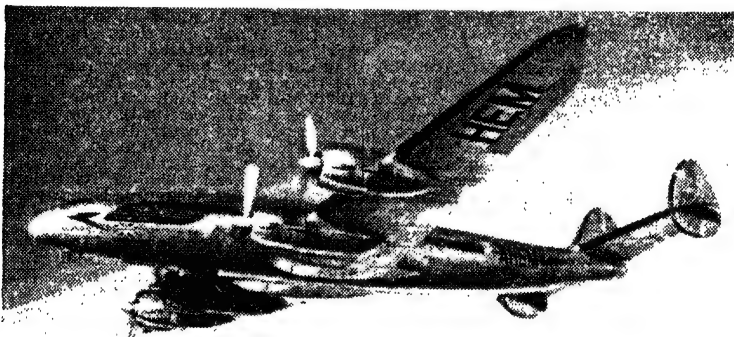


FIG. 1. FOUR-ENGINE MONOPLANE AIR-LINER, 1945

Lockheed Constellation (Wright Cyclone 2500-h.p. engines) used for transatlantic flying; it has a pressure cabin to increase passenger comfort above 10,000 ft.

of over 200 m.p.h. About this time the monoplane began to come into favour on the Continent and in the U.S.A., first for air-liners and later for military use. With the advent of the monoplane there was also a gradual change over to wood, and then to metal-covered structures. During the period 1919 to 1931 the Schneider trophy contest gave a fillip to the development of high-speed A.S. and the Supermarine S 6 and Rolls-Royce R engine of 1929 and 1931 were the direct ancestors of the Spitfire and Merlin.

In the early 1930's the Americans started to use 200-m.p.h. air-liners, the Boeing 247, Lockheed Orion, and Douglas DC-2 being amongst the first. Gradually other countries followed their lead, although Great Britain, in particular, retained strut-braced, fabric-covered bi-planes until shortly before the Second World War for many civil and military purposes. In 1935-6 a number of outstanding prototypes appeared in Great Britain: the Short Empire flying-boat, the first really modern 200-m.p.h. large flying-boat; the first single-seater fighters to exceed 300 m.p.h., the Hurricane and Spitfire; and the first light bomber to

Handley Page Halifax, and Short Stirling; the fast wooden light bomber-fighter-reconnaissance de Havilland Mosquito; the Amer. high-altitude long-range Boeing Superfortress heavy bomber; and the Ger. Messerschmitt Me 163 (Fig. 2) and 262, the first jet-propelled, 500 m.p.h. fighters.

By the end of the war speeds of 600 m.p.h. (Gloster Meteor, Fig. 3); bomb loads of 10 tons (Lancaster); ranges of 5000 m. (Superfortress); passenger loads of over 100 (Boeing C-97); and ceilings of 45,000 ft (Spitfire XIV) were practical propositions, and not mere record performances. Post-war performance has increased rapidly. The first supersonic flight was made by Capt. Charles Yeager, U.S.A.F., in the Bell X-1 research aircraft in 1947, since when supersonic speeds have become normal for fighter aircraft. The Amer. Bell X-2 research aircraft is reported to have attained 2026 m.p.h.

To make possible such speeds, designers have turned largely to the use of thin swept-back wings or delta wings, together with new light-weight, heat-resistant metals such as titanium.



FIG. 2. TAILLESS ROCKET-PROPELLED FIGHTER MONOPLANE, 1944

The Messerschmitt Me 163, which, although not a great success, represents some of the latest ideas on high-speed design and was the first operational type capable of more than 550 m.p.h.

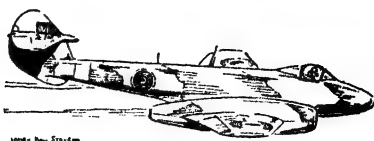


FIG. 3. TWIN-JET, SINGLE-SEATER FIGHTER, 1946

The Gloster Meteor IV (3000-lb. thrust Rolls-Royce Derwent jet engines), which, very slightly modified, broke the world's speed record at 616 m.p.h. on 7 Sept. 1946.

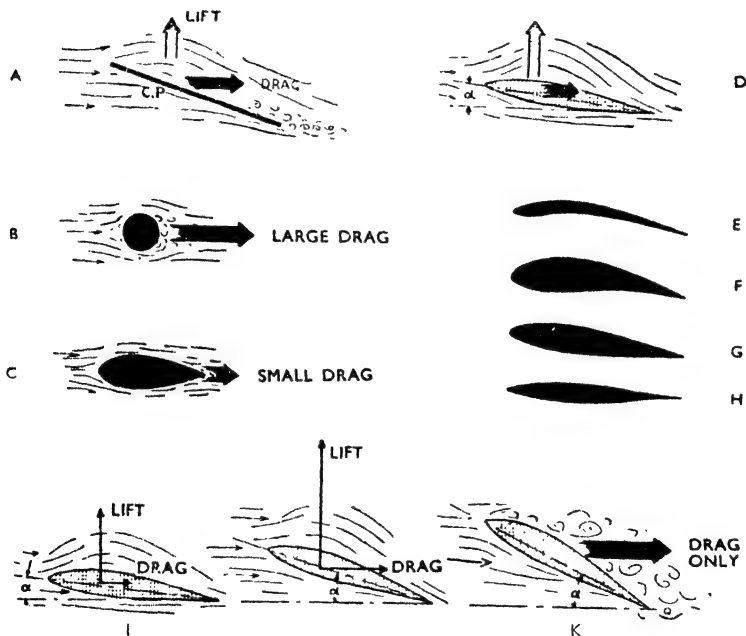


FIG. 4. DEVELOPMENT OF THE AEROFOIL SECTION AND THE EFFECT OF ANGLE OF INCIDENCE UPON LIFT

- | | |
|---|--|
| A. Flat plate—lift and drag, act at C.P., centre of pressure | G. Modern general purpose bi-convex section |
| B. Cylinder—drag only | H. High-speed thin symmetrical section |
| C. Streamline—low drag | I. Small incidence (α): moderate lift, low drag |
| D. Aerofoil section—combination of (A) and (C) giving lift and low drag | J. Large incidence: high lift, increased drag |
| E. Early thin, highly curved section | K. Stall: breakdown of air flow, no lift, large drag |
| F. Thick, high-lift section as used on gliders | |

Theory of flight. Briefly the lift of a wing is obtained from the suction above and pressure beneath a plate when it is passed through the air at speed (Fig. 4). Since a thin plate is not very efficient, and is difficult to construct, it is combined

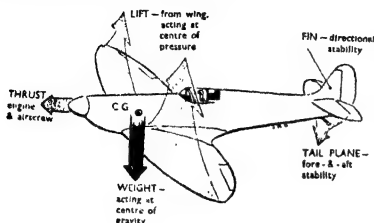


FIG. 5A. THE PRINCIPAL FORCES ON AN AEROPLANE IN STATIC EQUILIBRIUM

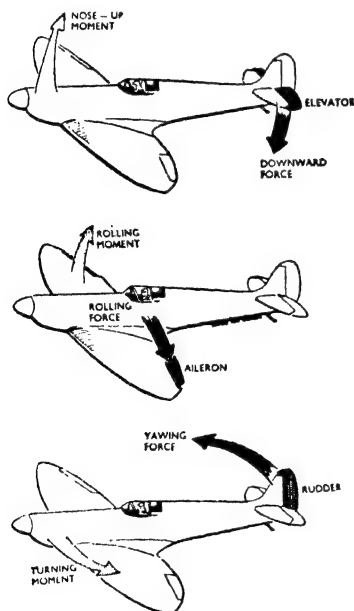


FIG. 5B. THE ACTION OF THE THREE CONTROL SURFACES

with a streamline to form an aerofoil section. There are hundreds of such sections, the earliest being thin and highly curved (Fig. 4*b*); then they began to become thicker (and easier to make structurally), until with the advent of very high speeds after 1940 they were made thinner again (Fig. 4*h*).

The lift of the wing increases with the angle to the airflow (*a*), as does the drag, or resistance, until at a point called the stall the air ceases to flow smoothly over the wing and all lift is lost. This state of affairs also exists when the speed of the wing through the air is insufficient to cause enough suction to give lift.

When a wing moves through the air at high speed the boundary layer (or envelope) of air close to its surface moves at a lower speed than the rest, owing to its clinging to the surface of the aerofoil. If this boundary layer is flowing smoothly (laminar flow) there is little resistance, but if it is turbulent there is a great deal of drag. At the present time much energy is being expended in trying to induce this laminar flow, for as the speed of sound is approached the turbulent area

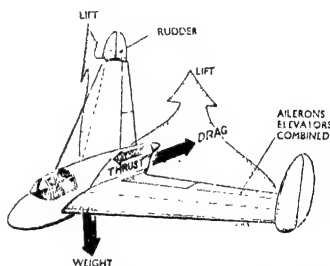


FIG. 6. EQUILIBRIUM AND CONTROLS OF A TYPICAL TAILLESS AEROPLANE

creeps forward until it breaks away in a shock wave. This shock wave is a sudden increase in pressure where the local velocity of the air exceeds the speed of sound. When this occurs there is a very sudden rise in the drag of the wing, while just before its onset there are sev. disturbing phenomena that upset the stability of the A.

A wing on its own would be of little use, and at the rear of the fuselage a fixed horizontal tail plane and a fixed vertical fin provide stability (Fig. 5*a*). Control is obtained by adding hinged flaps to wing, fin, and tail plane. A tail on the end of the fuselage is not essential to stability, although it is the simplest way of obtaining it. Many tailless A.s have been built and flown successfully. One of the commonest forms is shown in Fig. 6; the rudders are at the wing tip, while the ailerons and elevators are placed along the trailing edge of the swept-back wing—balance being obtained by this sweep-back. Obviously where there is no tail, weight and drag are saved, while recent aerodynamic research has shown that sweep-back has a good effect on air flow at high speeds, so that such A.s are becoming more common.

Since the air resistance of the wing is the greatest part of the resistance of the whole A., it has to be kept as small as possible. A small wing provides less

lift, so a compromise is made by fitting slots to the leading edge and/or flaps to the trailing edge. The action of these devices is shown in Fig. 7. Most modern A.s have flaps of some type and many have slots.

Structural developments. The essential need for an A. structure has always been lightness. This was once achieved by using frameworks of wood braced by wires and covered with fabric for both wings and fuselage; gradually there was a

with problems: it must be light yet capable of supporting sev. times the weight of the whole A. when it is brought violently to the ground; it has to be resilient to absorb such shocks and at the same time it must not be too springy or the A. will bounce badly when taxiing. Early undercarriages consisted of 2 light wire-spoke wheels carried on an axle tied to the apices of 2 wood or tubular vees by rubber cord, which served as the sole shock absorber. Later coiled

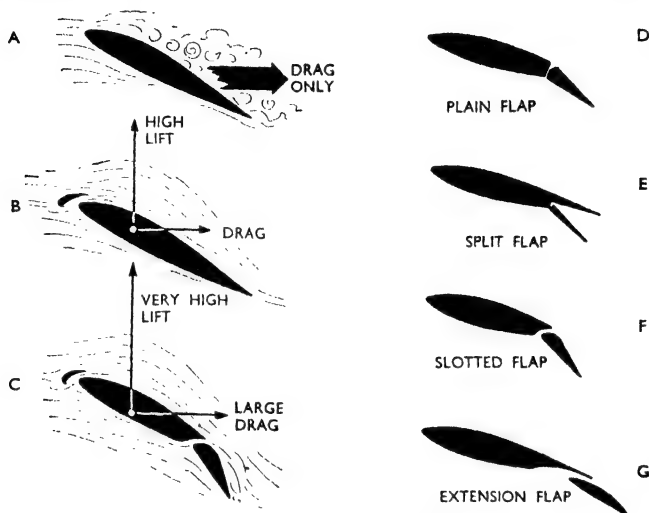


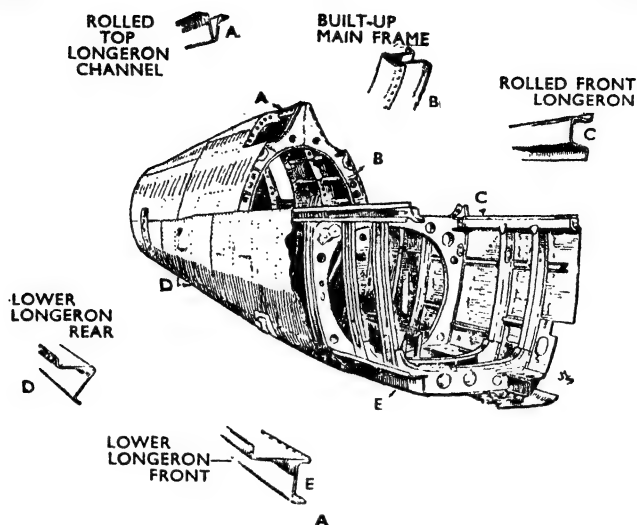
FIG. 7. HIGH-LIFT DEVICES

- A. Stalled wing
- B. Addition of slot to (A) smooths air flow and prevents stall, at same time giving high lift
- C. Addition of flap to (B) increases both lift and drag
- D. Plain flap
- E. Split flap
- F. Slotted flap
- G. Extension flap, increases area as well as camber

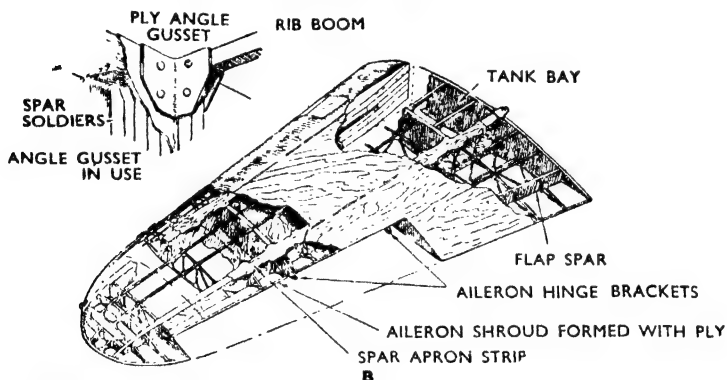
change to fabric-covered tubular metal structures (some still wire-braced, others welded) or to all-wood designs where the plywood skin of fuselage and wing (Fig. 8B) carried part of the structural loads. Since 1930 the tendency has been to make all classes of A. of the all-metal stressed-skin type (Fig. 8A). In this case the whole A. is usually made of an aluminium alloy, the fuselage having light longitudinal members (stringers), light transverse frames, and a sheet-metal covering; the whole being joined by riveting and forming, in effect, a light metal tube. The wing is of similar construction, but the main loads are taken by one or more transverse spars.

The alighting gear (undercarriage) of A.s has always presented the designer

with problems: it must be light yet capable of supporting sev. times the weight of the whole A. when it is brought violently to the ground; it has to be resilient to absorb such shocks and at the same time it must not be too springy or the A. will bounce badly when taxiing. Early undercarriages consisted of 2 light wire-spoke wheels carried on an axle tied to the apices of 2 wood or tubular vees by rubber cord, which served as the sole shock absorber. Later coiled



A Spitfire stressed-skin metal fuselage with light alloy stiffening members and duralumin skin.



B An Oxford wooden main plane with spruce and plywood spars and light lattice ribs, the whole covered by plywood.

FIG. 8A & B. WOOD AND METAL AEROPLANE STRUCTURES

been designed using electric motors and screw jacks.

Originally piston engines (see **AERO-ENGINES**) were used to drive the airscrew, but now jet engines are replacing them for high-speed A.s. Where only moderate speeds are required the jet engine is inefficient and the turboprop engine is used. With this engine more thrust can be obtained at take-off and the cruising power is more economically converted into thrust. The airscrew has

been developed from a wooden 2- or 4-bladed type, first to a duralumin or steel one and then (in 1927) the variable-pitch mechanism was added. The object of this is to change the angle of the blades to suit the speed of the A., so that the engine can be run at its best r.p.m. whatever the speed of the A. Another advantage is that the blades can be feathered to present low drag if an engine stops in flight. The latest development is a reversible-pitch airscrew in

which the blades are turned right round to give a negative thrust and so slow the A. on landing. The reversible pitch can also be used for manoeuvring a multi-engined A. on the ground, or on the sea, rather as an oarsman backs water.

Seaplanes are of 2 general types: land A.s mounted on floats, and flying-boats, where the fuselage is turned into a hull. The flying-boat is generally used for the larger sizes, while the float plane is used for smaller and faster types. For a long time (from 1925 to 1939 approximately) the world's speed record was held by seaplanes because they were easier to land and take off at high stalling speeds. The advent of 'clean' monoplane landplanes and wartime construction of airfields all over the world brought a loss of interest in flying-boats. However, new hull designs and the use of jet power has made possible flying-boats with speeds of more than 600 m.p.h., and many are used by the U.S. Navy for mine-laying, reconnaissance, anti-submarine, and transport duties.

See also AERIAL NAVIGATION; AERO-ENGINES; AERONAUTICS; ATLANTIC FLIGHTS; AVIATION, CIVIL; SCHNEIDER TROPHY.

See A. S. Niles and J. S. Newell, *Airplane Structures*, 1938; C. H. Latimer-Needham, *Aircraft Design: Aerostructures*, 1939; R. Abbott, *Fundamentals of Flight*, 1942; M. Langley, *Metal Aircraft Construction*, 1942; W. Lockwood Marsh, *The ABC of Flying*, 1945; L. Bridgman, *Jane's All the World's Aircraft* (ann.).

Aeroscope, instrument for measuring the purity of the air. Air is drawn by an aspirator across a film of glycerine for a given time. The particles adhering to the film are examined for quantity, and an estimation of the amount of dust in the air is arrived at.

Aerosol, a dispersing mist of fluid, usually fungicidal, insecticidal, or perfume, created by releasing under pressure. A.s are used in closed spaces—glasshouses, rooms, cinemas, etc.

Aerostation, lighter-than-air flight. See AERONAUTICS.

Aerotherapeutics, use of air for the treatment of disease. Air is used in the treatment of disease mainly in three ways: (1) by altering the atmospheric pressure on the body as a whole or on selected organs; (2) by modifying the composition of the atmosphere; and (3) by varying the temperature of the atmosphere. When a diver emerges suddenly from work in deep water under conditions of great pressure, symptoms somewhat resembling those of apoplexy sometimes present themselves. This disease, which is known as caisson disease, or diver's paralysis, may at once be checked if the patient is subjected in an air-lock to a pressure greater than that of the atmosphere, and the pressure then gradually reduced as the body accommodates itself.

The effects of high-altitude flying in a low atmospheric pressure are counteracted either by pressurising the skin of the aircraft, as in passenger-carrying planes, so that the atmospheric pressure

within the cabin remains relatively unchanged, or by the inhalation of oxygen. The latter method has to be used by high-altitude climbers. For some unknown reason a low atmospheric pressure is beneficial in whooping-cough and special chambers have been devised, similar to those used in caisson disease, for the accommodation of patients in a lowered atmospheric pressure for regular periods. Some cases of asthma have responded to periods of subjection to an increased atmospheric pressure. The use of air to exert pressure on particular organs is exemplified by the artificial pneumothorax treatment for collapsing and resting a diseased lung in pulmonary tuberculosis (see TUBERCULOSIS). Air at atmospheric pressure is introduced into the intrapleural space (see LUNGS, PLEURISY), and, since the pressure in the space is a negative one, the lung on the treated side collapses. Refills of air at slightly increased pressure are given at regular intervals to prevent the collapsed lung from re-expanding. Another treatment, with a mechanical action similar to that of pneumothorax, is that of artificial pneumoperitoneum. Air is introduced under slight positive pressure into the peritoneal cavity (see PERITONEUM), and this air collects under the diaphragm and restricts its movement.

The Drinker respirator, or 'iron lung,' is an apparatus for carrying out artificial respiration over long periods, for instance when the respiratory muscles have been inactivated by infantile paralysis. It consists of a large metal chamber, containing the patient's body but not his head, in which the air pressure can be alternately increased and decreased, affecting expiration and inspiration respectively.

The diminution of air pressure is the effective principle of Juwood's boot. A case of stiff leather is made to enclose the leg, so that when the air is exhausted blood rushes to the enclosed part.

The old treatment of 'cupping' consisted of the induction of a negative pressure within a metal cup placed over a particular part of the body surface, thus causing a hyperaemia in the blood-vessels of the area.

The composition of the inhaled air is modified in the treatment of certain respiratory diseases, but A. in this respect should not be confused with the administration of drugs by inhalation, as, for example, in anaesthesia or in medicated sprays. The use of the steam kettle in bronchitis aids expectoration by increasing the humidity of the atmosphere. Solutions of detergents, or wetting agents, are used suspended as droplets in an oxygen spray for the same purpose. Ammonia vapour removes sulphuric acid from a 'smog'-polluted atmosphere, and under such conditions it is used to purify the air in cases of respiratory disease. The inhalation of oxygen is often beneficial in cases of asthma, and also relieves the difficulty of breathing in pneumonia and heart failure.

The relaxing and stimulating effect of hot and cold air respectively is made use of in physiotherapy (q.v.).

Finally, the lethal effect of oxygen on many bacteria (q.v.) is the basis of the open-air treatment of tuberculosis and of fresh-air, open-window treatment of all respiratory infections.

Aerschot, see AARSCHOT.

Aertzen, or Aartsen, Pieter (1507-73), Dutch painter, called Peter the Long because of his height, was *b.* and *d.* at Amsterdam. Besides his historical and religious works he painted interiors and homely scenes.

Aeschines (c. 390-c. 329 bc), Athenian orator and prin. rival of Demosthenes (q.v.), with whom he was ambas. to Macedonia in 348 and by whom he was afterwards unsuccessfully prosecuted. In 330 he attacked the anti-Macedonian policy of Demosthenes in a prosecution directed immediately against Ctesiphon, who had suggested the award of a golden crown to Demosthenes as a mark of gratitude for his services to the State. A's speech *Against Ctesiphon* delivered on this occasion is extant; it was answered by Demosthenes in the *De Corona*. A. lost his case and went into exile, first to Asia Minor and later to Rhodes, where he estab. a school of eloquence. His style, though excellent in itself, is marred by lack of judgment. The text of his surviving speeches has been ed. (with trans.) by C. D. Adams (Loeb Library), 1919. See J. F. Dobson, *The Greek Orators*, 1919.

Aeschines Socraticus (4th cent. bc), Gk philosopher, a friend of Socrates. Having become bankrupt through the failure of his perfumery business, A. S. left Athens and retired to the Syracusan court. After the expulsion of the younger Dionysius (357 bc) he returned to Athens and taught privately. Some extant remains attributed to him are not genuine.

Aeschinite, see TITANIUM.

Aeschylus (525-456 bc), Gk tragic poet, *b.* at Eleusis; son of Euphorion, a member of the old Athenian nobility (Eupatridae). He fought at Marathon (490), A. first exhibited at the Dionysiac festival in 499, and won his first victory in 484. In 476, and again in 472, he visited the court of Hieron I at Syracuse. His third Sicilian journey, from which he did not return, was made soon after the production of the *Oresteia* in 458. He *d.* at Gela. A's reputation as the father of Gk tragedy is based upon the fact that he raised it above the status of a mere choral exhibition by introducing a second actor as well as by his improvements in staging. His verse is marked by tremendous vigour and loftiness of tone; his thought upon the great problems of life and death is profound. According to Suidas (q.v.) A. wrote 90 plays. We possess only 7, as follows: *Suppliants*, *Persae*, *Seven against Thebes*, *Prometheus Bound*, and the *Oresteia*, the only extant trilogy, consisting of *Agamemnon*, *Choephori*, and *Eumenides*. Our prin. source for the events of A's career is the 11th-cent. Medicean MS. at Florence. The first full text of the plays was pub. by Victorius

in 1557. The best complete modern ed. available to Eng. readers is that of Gilbert Murray (Oxford Classical Texts), 1937. There is a trans. by G. M. Cookson in Everyman's Library (1955). See G. G. A. Murray, *Aeschylus the Creator of Tragedy*, 1940 and F. R. Earp, *The Style of Aeschylus*, 1948.

Aesculapius (Gk *Asclepius*), god of the medical art, according to Homer was the 'blameless physician' whose sons were physicians in the Gk army. The common story is that he was a son of Apollo and instructed by Chiron in the art of healing and in hunting. He healed the sick and restored the dead to life, for which he was killed by Zeus; but later he was placed among the stars. The chief seat of his worship was Epidauros, whence it spread to Rome, 293 bc. The Asclepiadae (supposed descendants of A.) were an order of priests claiming a knowledge of medicine. Their prin. seats were Cos and Cnidus. See E. J. and I. Edelstein, *Asclepius* (2 vols.), 1945.

Aesculic Acid, see ESULIC.

Aesculus, genus of deciduous trees and shrubs, family Hippocastanaceae, about 25 species. See HORSE CHESTNUT and BUCKEYE.

Aesernia, see ISERNIA.

Aesir, see ASES.

Aesop (*Aesop*) (fl. c. 570 bc), Gk composer of animal fables. According to tradition he was a native of Phrygia and afterwards the slave of one Iadmon at Samos. Having received his freedom he visited Croesus, who sent him on a mission to Delphi. There he became involved in a dispute and was hurled over a precipice. It is doubtful whether A. left any written works; but it is certain that prose fables bearing his name were popular at Athens, and according to Plato, Socrates turned some of these into verse during his imprisonment. The fables now extant in prose and bearing A's name are undoubtedly spurious. See also BABRIUS. See A. Hausrath, *Corpus Fabularum Aesopiarum*, 1940.

Aestheticism. This word, which in its original and general sense implied an attachment to aesthetic principles, came to be applied particularly to a movement in art which in the seventies and eighties of last century was characterized by many whimsicalities and absurdities. Arising from a natural and healthy reaction against the ugliness and philistinism of the mid-Victorian era, and represented in different ways by Ruskin, Morris, Swinburne, Pater, and Whistler, it developed, under Oscar Wilde and others, tendencies which justly made it the butt of much ridicule, drawing down on it the shafts of satire of Ihu Maurier in *Punch*; and W. S. Gilbert in his operetta *Patience*, 1881, ridicules one Bunthorne, who walked down Piccadilly with a poppy or a lily in his medieval hand. As a movement it was non-creative, but the artists and thinkers whose ideas it tried to follow (and somewhat distorted) did much to renew an aesthetic sense among their countrymen.

Aesthetics is the name given to that

science or philosophy which treats of the beautiful and attempts to establish the principles and theories upon which works of art are based. The word is derived from the Gk *aisthētikos* (that which concerns feeling or perception), and it was in Greece that the theories of A. were first propounded. As instancing the importance attached to this subject by the philosophers of classical antiquity, one recalls the amount of attention devoted to it by Plato and Aristotle. The name of Plato will always be remembered in all discussions on the nature of the beautiful, whilst Aristotle, in his discourse on the theory of art in poetry contained in his *Poetics*, contributed to aesthetic literature the most important work among the ancients. In it he treats of tragedy, a form of dramatic art carried to great heights by the dramatists of his time. His canons of criticism, many of which are still valid, include the assertion that beauty is the mean between two extremes, neither too large nor too small. Plato's teaching on the subject is in keeping with his general theory of an absolute and perfect ideal behind all appearance. From this it follows that beauty in finite things arises from their correspondence to their ideal archetype. This doctrine of Plato is expressed by the poet Keats in his *Ode on a Grecian Urn*, in the oft-quoted lines, 'Beauty is truth, truth beauty—that is all Ye know on earth, and all ye need to know.' The science of A. has been divided into subjective and objective. The objective side deals, *inter alia*, with the relationship of art to nature, the classification of the sev. arts, and the definition of their functions and limitations. Subjectively the question is largely one of psychology and an attempt to determine the nature and origin of aesthetic judgment or taste, and this dept of the science is further subdivided into consideration of the conditions of artistic production and of artistic appreciation or perception. The latter aspect of the theory is put succinctly in the phrase that 'Beauty resides in the eye of the beholder.' The modern science of A. may be said to have been inaugurated by the pub. in Frankfurt at about the middle of the 18th cent. of *Aesthetica*, a book by Baumgarten, a disciple of the Ger. philosopher Christian Wolf. In this work, which earned him the title of the father of modern A., he differentiates between truth, which is apprehended by reason, and the beautiful, which is perceived by sense; sense, he maintains, is on a lower plane of intellect. Following Baumgarten came a whole host of Ger. philosophic writers, who can only be briefly enumerated here. First comes Winckelmann, who developed Baumgarten's theories. Lessing in his *Laocoön* defined the spheres of poetry, painting, and sculpture. Schiller, the poet, who by influencing Goethe influenced the current of European thought, defined the secret of art as the supersession of the matter by the form. Kant denied the possibility of a strict science of beauty, for he regarded it as subjective. Fichte

and Schelling, Herbart and Schopenhauer are the names of other Ger. aesthetic writers, the place of art being exalted in the latter's philosophy; but Hegel dominates all, his *Lectures on Aesthetics* being the chief work on the subject. Eng. writers include Hume, Burke, Alison, and Ruskin, the French contribute Diderot and Buffier, and the Italians Croce. See B. Bosanquet, *A History of Aesthetic* (4th ed.), 1917; B. Croce, *The Essence of Aesthetic*, trans. 1921; E. F. Carritt, *The Theory of Beauty*, 1923; R. G. Collingwood, *The Principles of Art*, 1938.

Aestivation (Lat. *aestivus*, belonging to summer), or **Prefloration**, in botany, term to describe the way in which the floral organs are arranged in the flower-bud, as veneration or prefoliation describes the arrangement of leaves in a leaf-bud. If the parts do not touch, the A. is *open*, if they touch but do not overlap it is *valvate*, if they overlap it is *imbricate*. When the A. is such that 2 parts overlap completely, 2 parts are completely overlapped, and 1 part overlaps at 1 edge and is overlapped at the other, it is called *quincuncial*; A. is *convolute* or *contorted* when each part overlaps another and is itself overlapped at one edge.

Aestivation (Lat. *aestivare*, to pass the summer), or **Estivation**, in zoology, state of dormant vitality in summer of some animals, such as land snails, in warm climates which prevents them from suffering from heat or drought. During dry periods the African and S. Amer. lung-fishes sleep in burrows in the mud. It is opposed to hibernation, which is a state of dormant vitality in winter.

Aetas, name by which the Negritos of the Philippine Is. are known among themselves. They are dwarfish in stature, with round heads, bulging foreheads, large eyes, and woolly hair, and are almost wholly uncivilised.

Æthelbald, **Æthelbert**, etc., see **ETHEL-BALD**, etc.

Aether, or **Ether**, medium once assumed to fill all space and matter, through which electro-magnetic waves were transmitted. The idea of an exceedingly tenuous medium pervading the whole universe has suggested itself to philosophers of all ages. In the Hindu mythology it is given as one of the 5 elements: earth, water, fire, air, and ether. Descartes elaborated a vortex theory of matter, in which he conceived all space to be filled with one substance whirling round in great vortices. It was thus he explained the formation of the solar system, particles flying off from the centre to the circumference constituting the light radiated from the sun. Leibnitz in 1671 declared his belief in an A., a fine substance permeating all bodies in the direction of the earth's axis and producing the phenomena of gravity, elasticity, etc. Kant pub. in 1753 a thesis which postulated an A. connecting all matter. It seemed necessary to him, in order to explain action at a distance, that bodies should operate upon each other by means of an elastic and subtle medium,

uniformly diffused through the universe. This medium, he was convinced, was the underlying substance of heat and light.

The later development of the conception of an A. occurred mainly in connection with the mathematical treatment of physical phenomena, particularly with regard to the propagation of light. Newton conceived light to be occasioned by particles moving with great velocity in straight lines from the source. He explained refraction by assuming periodic changes in the velocity of the light corpuscles; they have, he said, alternate fits of easy reflection and easy refraction, and it depends on which of these a particle is in when it reaches the surface whether it will be reflected or refracted. A ray of white light, he maintained, consists of many particles with differing periods of refrangibility and reflectibility, the most refrangible causing the sensation violet, and the least refrangible producing red. Newton objected to the wave theory held by Huygens and his supporters in that it did not explain the rectilinear propagation of light, or the phenomenon of double-refraction. It was inconceivable, he also said, that a medium should be so transparent that light could reach us from stars known to be enormous distances away. Nevertheless the wave theory was to triumph; investigation of the phenomena of interference and polarisation (q.v.) led to their being explained by undulatory motion, so that the corpuscular theory hardly survived the 18th century.

In 1801 Thomas Young once more put forward the hypothesis that luminiferous A. pervades the universe, that it is rare and subtle in a high degree, and that it is by vibration in this medium that light is propagated. The A. was conceived of as offering no opposition to the passage of material substances; 'it passes through them,' he said, 'like the wind through a grove of trees.'

The existence of A. having been assumed to explain light waves, it was therefore necessary, in order to avoid postulating different kinds of media, to discover some connection between light propagation and other physical processes acting through space. Faraday showed that iron filings spread on a card held over a magnet arranged themselves in a series of curved lines between the poles. These were called lines of force and indicated some disturbance or stress in the medium connecting the poles of the magnet. He also showed that an electric current was induced in a continuous conductor cutting the lines of force. For years he attempted to discover whether magnetism had any effect on polarised light, until in 1845 he succeeded in producing the rotation of the plane of polarised light by transparent dielectrics in a magnetic field. Thus magnetic force and light were shown to have a relation to each other, and the A. was now looked upon not only as the light medium, but as the medium of electric disturbances as well. Faraday's work was carried further by Clerk-Maxwell and Lord Kelvin. The latter

interpreted magnetic force in terms of a rotatory movement of the A., the energy of irregular translation constituting heat, the theory of the transformation of energy being thus considerably advanced. By calculating from the energy of solar radiation near the sun's surface, Kelvin proposed a value of 5×10^{-10} g. cm⁻³ for the density of A. The further investigation of mathematical values in connection with light-waves led Sir Joseph Larmor to the conception that A. corresponds to a solid with a density considerably smaller than any known substance and quite incompressible. To sum up: The A. has long been regarded as the vehicle of light. During the 19th cent. it was regarded as the medium, filling all space, through which light, gravitational forces, and electro-magnetic waves were propagated; it was widely believed that the A. was material, having the properties of matter, such as mass, rigidity, and motion. Matter itself was regarded as vortices in the A., but this view was abandoned as being illogical, since the A. could not consist of vortices in the A. Michelson and Morley in 1881 and 1887 attempted to discover the existence of an A.-drift at the earth's surface, and their experiments, which gave negative results, led to the principle of relativity. Sommerfeld says that 'nowadays we like to avoid speaking of the A., since the theory of relativity has deprived it of its material existence in the older sense,' but, as Eddington points out, 'this does not mean that the A. is abolished. It is agreed that the A. is not a kind of matter, and, being non-material, its properties are *sui generis*—it has definite characters of its own.' Sir Oliver Lodge indicated some of its properties: it fills all space in the most thorough manner, it is absolutely cold, it is absolutely transparent and undispersive, it is devoid of viscosity, it is the sole vehicle of radiation, i.e. of light, X-rays, wireless waves; electric and magnetic fields are forms of energy existing in the A., and since all varieties of matter are ultimately electrical in origin, being composed of protons and electrons, Lodge asserted that 'the A. is indirectly responsible for all physical and chemical activity. What other functions this universal medium may be found to possess, and whether life and mind can be in any way associated with those functions, it must be left to posterity to find out.' The view of most physicists to-day is that since a fixed A. is not observable the concept has a very limited application. However, whenever physical properties are ascribed to space, it can be said that some kind of ether is being proposed.

Aethicus, see ETHICUS.

Aethiopia, see ETHIOPIA.

Aethusa, anct name of Favignana, the largest of the Aegadian Is., in the Mediterranean. It is 6 m. long, and has a pop. of 7000.

Aetiology, see ETIOLOGY.

Aetion, or **Eetion**, Gk painter, b., according to Pliny, 350 bc. References are made to him by Cicero, Pliny, and

Lucian. He was contemporary with Alexander and Apelles. His chief work represented the marriage between Alexander and Roxana.

Aetius, 'the Atheist,' native of Coele-Syria, fl. in the 4th cent. AD. After following various trades he became a doctor, and gained distinction particularly in medical controversy. Leontius of Antioch installed him deacon, but his heterodox views caused his banishment from the tn. In AD 356 he went with Eunomius to Alexandria, only to be exiled by Constantius. He was recalled by Julian, and elevated to the rank of bishop. Here he used his influence on behalf of Arianism, but retired on the succession of Valens, and d. 367. A work entitled *De Fide* survives.

Aëtius (d. AD 454), Rom. general, b. Moesia; son of Gaudentius, Count of Africa. He spent some years of his early life as a hostage among the Goths and Huns, obtaining a knowledge of their ways which enabled him afterwards to accomplish their defeat. In 424 A. invaded Italy at the head of 60,000 barbarians to support Iovannes who had proclaimed himself emperor. After the latter's defeat A. was given supreme command in Gaul. In 432 he slew Count Boniface in single combat, and became thereafter the most conspicuous figure in the moribund Rom. empire. In 451 he led the imperial forces to victory against the Huns at Châlons-sur-Marne; but was assassinated three years later by Valentinian III, who suspected him of designs upon the Crown.

Aetius of Amida (502-75), physician, b. Amida, Mesopotamia. He was physician to Justinian I at the court of Byzantium and was the first Christian physician of note. His great *Tetrabiblion*, first printed in Gk text (vol. i only) in 1534, included the writings of earlier men who might otherwise have been forgotten. He also compiled a treatise on diseases of the eye and an important work on obstetrics and gynaecology. He described diphtheria, intestinal worms, aneurysm, and cirrhosis of the lung.

Aetna, see ETNA.

Aetolia, region of NW. Greece, now part of the dept of A. and Acarnania, divided from Acarnania proper by the R. Achelous. N. A. is mountainous, barren, and sparsely populated. The basins of the lower Achelous and Evenus are intensively cultivated and produce tobacco, currants, vines, and maize. The chief tn is Missolonghi (q.v.). The rivers are laden with silt and their deltas are marshy. Little is known of aet A. before the 4th cent. BC, when the Aetolian League was formed. It gained control of Delphi and was a major power in Hellenistic Greece, being a rival to Macedon and at first an ally of Rome. The League was defeated by the Romans when it sided against them with the Seleucids. A. then lost all real independence. It was under Turkish rule from the 15th cent. till 1912. Area 2990 sq. m. Pop. 220,100.

Aetolikon, see ANATOLIKO.

Afer, Domitius, Rom. orator, b.

Nemausus (Nîmes). Quintilian, who was for some time his pupil, calls him the greatest orator he had ever known. In the reign of Tiberius A. acted as an informer, and was responsible for the death of Claudia Pulchra. He was consul in AD 39, superintendent of the water supply under Nero, and d. as a result of his intemperate habits in AD 60.

Affettuoso, It. musical term, indicating that a passage should be played with feeling. *Con affetto* is used alternatively with this term.

Affidavit, statement of facts in writing made upon oath, or by a solemn affirmation, before a commissioner for oaths. The word is derived from the old Lat. form of a declaration on oath, which commenced thus, 'Affidavit M. N.' i.e. 'M. N. has sworn.' The employment of A.s is generally confined to litigation, but sometimes the A. is employed to lend force to a public statement, for the person who knowingly and advisedly falsely swears to an A. is liable to punishment for perjury. In judicial proceedings the A. is used in lieu of oral evidence, and particularly is this the case in interlocutory applications. Sometimes the whole of evidence may be taken by A., and this was especially the case in the old Chancery courts, but as a rule this practice is discouraged.

Affiliation. An A. order is an order made by an Eng. court of summary jurisdiction at the instance of the mother of an illegitimate child, or by the local authority where the child is in its care, ordering the father to pay a sum not exceeding 30s. a week for the maintenance and education of the child until the age of 16. The process is governed by the Bastardy Acts, 1845, 1873, and 1923, and the Affiliation Orders Act, 1914. The uncorroborated testimony of the mother is not sufficient proof of paternity, and an appeal to the quarter sessions may be made. Failure to comply with an order is punishable by imprisonment.

Affinity, in law, relationship through the fact of marriage. On the principle that man and wife are one flesh, one party to a marriage bears to the relatives of the other party a relationship by A. which is determined by the latter's blood-relationship, or *consanguinity* (q.v.). A. is only important in connection with the marriage law, which in England and Scotland is based in this respect on the Mosaic law as set forth in Lev. xviii. An important exception to the general rule that marriages are prohibited within the same degrees of A. as of consanguinity is provided by the Deceased Wife's Sister Act of 1907, which allows marriage between a man and a woman standing in that relationship. The objections to marriage within certain degrees of A. are distinct from consanguinity rest mainly on religious grounds; scientific observation having disclosed no reason for supposing that such marriages would result in degeneration.

Chemical affinity, the property by virtue of which atoms or groups of atoms tend to enter into chemical combination with

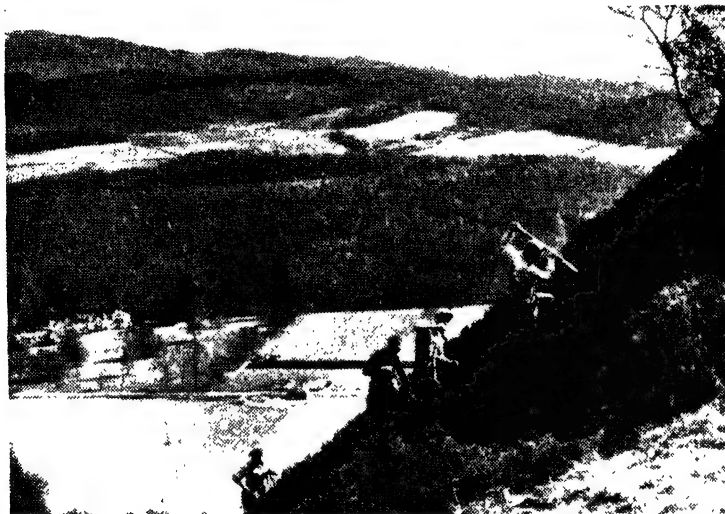
other atoms or groups. See CHEMISTRY; ELECTROLYSIS; VALENCY.

Affirmation, solemn declaration prescribed by the Oaths Act of 1888 as a substitute for an oath in all cases where for conscientious reasons a person objects to being sworn. An A. in court is subject to the same liabilities for perjury as an oath. The privilege of affirming was first granted to the Quakers in William III's reign, and gradually extended to other categories of people. See OATH.

Afforestation (from Lat. *ad*, to; Low Lat. *forestis*, unenclosed woods),

and paper-pulp plants. Simultaneously measures are taken to increase increment by afforesting more land, improving management in existing woodlands, and organising efficient protection from fire, grazing animals, insect pests, and fungal diseases.

At present Britain's industrial economy is dependent on timber grown abroad, mainly in N. Europe and N. America, 90 per cent being imported. For strategic and economic reasons A. must be extended to lessen this dependence, to make better use of hill lands, and to provide



A. D. S. Macpherson, Stirling

AFFORESTATION IN PERTHSHIRE, SCOTLAND

Forestry Commission workers planting Scots pine on heather-covered mountain land.

planting and tending of trees for timber production, maintenance of shelter and landscape effects, and prevention of soil erosion. Nearly all countries now take part in A. through Forestry Depts, which extend and manage national forests, encourage planting by private land-owners, regulate tree felling, and undertake research and education. In Great Britain the responsible authority is the Forestry Commission (q.v.); in N. Ireland the Ministry of Agriculture; and in the Irish Rep. the Ministry of Lands.

The principle followed in forest management is that of sustained yield. The wooded area is surveyed, the existing vol. of timber measured, and an estimate made of the increment, or amount whereby vol. increases yearly. The quantity of timber felled each year is then kept in line with the increment, ensuring a constant reserve of standing timber and steady supplies of felled logs for saw-mills

rural employment. The ann. consumption of timber is about 1100 million cu. ft. or 22 cu. ft. per head of pop., roughly one-third being consumed as paper, cardboard, rayon, and other manuf. substances. The reserve of standing timber is only 4000 million cu. ft. and the ann. increment 140 million cu. ft.; 90 million cu. ft. is harvested and 50 million cu. ft. put to reserve. The object of forest policy is to increase the reserve to 10,000 million cu. ft. and both the increment and the harvest to 350 million cu. ft., so meeting about one-third of consumption from home sources. To produce so much timber, 5 million ac. of well-managed forests are required. The present forest area of 3.7 million ac. includes 1 million of Forestry Commission plantations; 0.4 million ac. of bare land earmarked for early planting; and 2 million ac. of woodland under private ownership and suited for economic

timber production; the balance of 0.3 million ac. is mainly of shelter, recreational, or amenity value. The commission is gradually acquiring a further 1.6 million ac. of poor land, of little or no agric. value, for forest extensions. The eventual total of 5.3 million ac. overall will occupy one-tenth of the land area.

Woods under private ownership are scattered throughout the country, numbering many thousands. Forestry Commission properties number 500, nearly every co. holding one or more; the larger forests include Thetford Chase in E. Anglia (50,000 ac.), the New Forest in Hants (65,000 ac.), and the Forest of Dean in Glos. (25,000 ac.). But most of the big new extensions lie in Scotland, Wales, and the hills of N. England, examples being Glen Trool in Galloway (55,000 ac.), Coed Morgannwg in Glam. (36,000 ac.), and Kielder in Northumberland (71,000 ac.).

The A. scheme in the Rep. of Ireland shows a progressively increasing rate of development. The area of woods and plantations under State control has increased from 160,000 ac. in 1948 to 237,000 ac. in 1957. Between 1948 and 1950 the ann. rate of intake of land was increased from less than 4000 ac. to 20,000 ac. and has been maintained at approximately the same level since. The area of State forest nurseries was increased from 300 ac. in 1948 to 600 ac. in 1951, resulting in an increase in the planting programme from 8000 ac. in 1948 to 17,500 ac. (i.e. nearly 30,000,000 trees) in 1957. A Practical Training Centre (at which students spend their first year) has been estab. at Kinnitty Castle, Birr, and a new School of Forestry (at which the remainder of the 3 years' course is completed) was formally opened at Shelton Abbey, Arlow, in Feb. 1957. Already State A. has become one of the largest employers of labour in the country.

Forest trees are raised from seed in nurseries; after 1 or 2 years in seed-beds they are transplanted to promote the growth of bushy root systems. When from 2 to 4 years old and 6 in. to 2 ft high they are planted out in the forest, usually 5 ft apart, requiring 1750 per ac. Often the land is ploughed and drained prior to planting; it is fenced against livestock and rabbits. Weeding is needed for 2 or 3 years; numbers of deer must be controlled. Protection against fire is secured by leaving fire breaks unplanted, keeping available beaters, pumps, axes, and spades for fire fighters, ensuring arrangements for quick transport and aid from fire services and troops, and organising observation by patrols or from fire towers during dry weather.

Harvesting of timber begins when crops are around 20 years old, taking the form of small poles thinned out to give other trees more growing space. On average nine-tenths of the trees planted, and half the vol. of timber grown, is removed in a series of 10 thinnings between the twentieth and eightieth years. The remaining main crop of big select trees is

then felled, and the ground replanted or crop naturally regenerated by self-sown seedlings. Smaller poles removed are used for fencing, pit props, telegraph poles, paper pulp, and hardboard. Larger thinnings and main crop logs go to saw-mills for boxboards, railway sleepers, building timber, and furniture stock. Nine-tenths of the demand is for softwoods from coniferous trees, which fortunately produce large volumes rapidly (70-100 cu. ft per year) on poor hill land. Norway spruce and Jap. larch and 3 trees from Brit. Columbia, namely Sitka spruce, Douglas fir, and Lodgepole pine, are widely planted in wetter W. dists.; Scots and Corsican pines are preferred in the drier E. Some 10 per cent of planting is done with hardwoods or broad-leaved trees, including oak, beech, ash, elm, and sycamore, on the better soils, mainly in the S. and midlands of England; these supply wood for furniture, tool handles, and specialised industrial purposes.

Large A. areas are often well suited to recreation, particularly where they include hills too high for tree planting. Eight National Forest Parks have been opened, namely Glen More in the Cairngorms (12,500 ac.), Argyll near Dunoon (58,000 ac.), Queen Elizabeth between Loch Lomond and the Trossachs (41,500 ac.), Glen Trool in Galloway (130,000 ac.), the Border in Northumberland, Cumberland, and Roxburghshire (123,000 ac.), Hardknott in the Lake Dist. (7000 ac.), Snowdonia in N. Wales (22,500 ac.), and the Forest of Dean and Wye Valley woods (33,500 ac.). Camp sites are provided.

A. gives increased employment in thinly peopled dists., needing one worker to 100 ac. of woods, plus one or more in related industries. New forest vils. have been built at Kielder, Glen Trool, and in sev. remote forests in the Scottish highlands and the Welsh mts.

Affre, Denis Auguste (1793-1848), Archbishop of Paris. b. St Rome-de-Tarn. Educ. at St Sulpice, he became in 1818 prof. of dogmatic theology. As archbishop he endeavoured to establish peace between the soldiers and insurgents during the rebellion of 1848. Wearing a green branch to denote his peaceful intentions, he mounted a barricade. He was killed by a stray bullet. Among his works are many valuable treatises and an *Essai sur les hiéroglyphes égyptiens*, 1834, where he showed Champollion's system of trans. to be faulty.

Affreightment, see BILL OF LADING and CHARTER-PARTY.

Afghan Hound, native of Afghanistan, where it has been used for centuries as a hunting dog and guard. Rock carvings of 2220 BC show the dog in the same form as it is now known. It was introduced to England and shown for the first time in 1907. In build it resembles a greyhound, but appears shorter and heavier on account of the long shaggy coat which covers flanks, shoulders, hindquarters, and legs. The smooth muzzle of the long narrow head is in strong contrast with

the silky top-knot surmounting the skull. The ears are heavily feathered and carried close to the head. Legs are straight and well boned; the sprightly ringed tail has a curl at the end. The A. H. is intelligent but shy with strangers. It is hardy, and is essentially an outdoor dog; it should not be kept in tns or in small houses. According to official standards the height at the shoulder for dogs is 27-8 in., and for bitches 24-6 in. A number of colours are found, but cream, fawn, golden, or red are preferred; the nose is black in all but light-coloured dogs, which may have a brown nose.

Afghanistan, country situated at the NW. of the Indian sub-continent. It is bounded on the W. by Persia, in the N. by the U.S.S.R. (reps. of Turkmenistan, Uzbekistan, and Tajikistan), and on the E. and S. by Pakistan. The N. boundary runs from Zulfiqar on the Persian frontier to Kushk, the railway terminus on the Soviet line from Mary (Merv), and thence to the Amu Dar'ya (Oxus). The frontier with Pakistan is that settled by the Durand agreement of 1893. The country extends 400 m. from N. to S. and 600 m. from E. to W. The 7 major provs. are Kabul, Mazar, Kandahar, Herat, Kataghan, Samt-i-Mashrigi (E. Province), and Samt-i-Janubi (S. Province). The 4 minor provs. are Badakhshan, Farah, Ghazni, and Parwan. Its area is approximately 245,000 sq. m., being twice the size of Great Britain and Ireland. Pop. (estimated) 11,000,000.

The mt. system of A. contains the Hindu Kush range, with its continuation the Koh-i-Baba and the Firozkhol plateau. Of the Koh-i-Baba peaks, Shah Fuladi (16,870 ft) is the highest. Next in importance to the Hindu Kush and Turkestan mts are the Safed-Koh, whose highest peak is Sikaram, which is 15,600 ft above sea level. The rvs. may be divided into the 3 prin. basins of the Amu Dar'ya, Indus, and Helmand. In the Amu Dar'ya basin the Murghab and the Hari-Rud owe considerable value to their geographical position, as well as to the richness of their valleys. Before, however, these rvs. reach the Amu Dar'ya they disappear. Indeed, of the many streams that flow from the N. slopes of the Hindu Kush, only 2 reach the Amu Dar'ya, these being the Kokcha and the Kunduz. In the basin of the Indus are the Kabul and its tribs., which flow from the S. slopes of the Hindu Kush and the valleys of the Safed-Koh; the Kurram, and those streams flowing from the Waziri Hills and the Sulaimans. The Helmand, fed by the Arkandab, the Tarvak, and the Afghanistan, waters the whole of SE. A.

The climate, owing to the different altitudes, is very varied, and suffers sudden and severe extremes. The temp. for the greater part of the year changes through the extraordinary range of 30° in a day. In the N. the winter is marked by a lasting and rigorous severity; while in the Amu Dar'ya country the heat of summer reaches 120° F. To the severities of the intense heat are to be added the frequent dust storms and fiery winds;

while the night-time is rendered almost intolerable by the radiating heat absorbed during the day by the vast masses of rock. The most temperate region is at Herat. Generally the climate of A. may be said to be dry, whatever rain it receives being derived from the SW. monsoon. From the athletic and handsome appearance of the pop. it would be expected that healthy conditions prevailed. But the existence of frequent and intermittent fevers, and the almost universal suffering from bowel complaints, brought about by the too heavy abuse of a fruit diet, prove very costly to life.

The pop. of A. is made up of very diverse elements—Pathans, or Afghans proper, in the E. and S. provs.; Hazaras in the centre; a few Persians in the W.; Tajiks, Uzbeks, and Turkmens in the N. The prevailing religion is Islam. The official languages are Pashtu and Persian. The literature is mostly poetic, being partly in Persian and partly Pashtu. The best-known poets are Abdur Rahman and Khushhal Khan. Justice is administered under the canon law of Islam (*shariat*) and under customary law (*adat*). Elementary schools exist in considerable numbers, but there are secondary schools only in Kabul and the prov. capitals. In Kabul there are 2 teachers' training schools and a univ. founded in 1932 with faculties of law, science, medicine, arts, theology, and literature.

The Gov. of A. is a constitutional monarchy in which supreme legislative power is vested in the Parliament consisting of the king, a Senate (50 nominated members), and a National Assembly (171 elected members). There is also a Grand Assembly (Loe Jirgeh), summoned on important occasions.

The land, if well cultivated, would be rich in yield. The natural productions of A. include castor oil and tobacco from Kandahar, wheat, barley, cotton, grapes, melons, and the mulberry from Herat. The ash and elm are grown, and the apricot, apple, plum, quince, peach, and pomegranate are the prin. fruits, a branch of cultivation which absorbs considerable attention. In some parts the pistachio, valuable for its dyeing qualities, is cultivated. Over 100,000 ac. are under irrigation from canals and *karez* or underground channels fed from springs. The farmer still, for the most part, ploughs with a trivet of sticks and reaps with a 15-in. sickle. The prin. revenue is from the land—the State's share of the crop being from one-tenth to one-third of the gross produce, though unirrigated land is scarcely taxed at all. Salt, copper, silver, lead, coal, iron, lapis lazuli, and rubies are found. Industrially the chief articles manuf. are carpets, *poshtins*, i.e. clothing made from sheepskin, and cloth materials from the many varieties of goat-hair. Silks are manuf. at Herat and Kandahar, which tns owe their importance to this industry. Kabul has small factories producing utility articles such as matches and buttons. There are cotton-ginning plants at Kunduz, Pul-i-khumri, and Gul Bahar.

Irrigation projects have recently been completed in Herat and Kandahar provs. and hydro-electric plants are under construction on the Kabul and Arghandab rivs. The main exports are to India and Pakistan and include karakul (lambskins), spices, fruits, carpets, raw wool, and cotton (of 47,000 metric tons produced in 1955 about 10,500 tons were exported). Cotton goods, sugar, hardware, leather goods, tea, cement, and paper are imported from India and Pakistan. The main imports from the U.S.S.R. are oil products and petrol. There are no railways in A. All the carrying, until fairly

Sadozai family, became King of the Durrani on the death of Nadir. By 1750 Ahmad Shah had extended his dominion over all the country of the Hindu Kush lying between the Indus and Amu Dar'ya (Oxus) rivs. Its N. and W. boundaries were approximately those of A. to-day, but the Persian prov. of Khorasan acknowledged his suzerainty. In 1756 Ahmad Shah occupied Delhi and in 1761 defeated the Mahrattas at Panipat, regarded as one of the decisive battles of the world. In 1762 he defeated the Sikhs near Lahore, and for a short time his empire extended from the Atrek R. to



THE TOWN WALLS, GHAZNI, AFGHANISTAN

E.N.A.

The tomb of Sultan Mahmoud, the conqueror of India, is near by.

recent years, was done on the backs of camels and ponies; but to-day a number of the roads are fit for motor traffic except after heavy rain and snow, and though goods are still conveyed by pack animals, motor transport is rapidly supplanting pack transport as the chief means of conveyance. The prin. trade routes from A. to India are those connecting the Amu Dar'ya regions with Kabul, and those which lead from Kabul, Ghazni, and Kandahar to the Indian plains.

Available information on the origin and early hist. of the Afghan people is scanty and confused. What is now A. was at various times a part of the Persian, Ghaznavid, Mongolian, and Mogul empires and is often referred to by historians as the country of the Hindu Kush. There is no confirmation of the theory that the Afghans were of Heb. origin.

A. first emerges in hist. as an independent country in 1747 when Ahmad Shah Abdali, commander of Nadir Shah's (q.v.) bodyguard and a member of the

Delhi and from Tibet to the Indian Ocean. Before his death in 1773 he had given up the central Punjab to the Sikhs, retaining Peshawar and the N. Punjab.

Ahmad Shah's son Timur, who succeeded him, ruled for 20 years, and at his death the Durrani Empire still included Kashmir, Lahore, Multan, Peshawar, all A. S. of the Hindu Kush, Herat, and the provs. of Balkh and Khulm in the Amu Dar'ya valley. Thereafter, however, the empire rapidly disintegrated, and when in 1818 Dost Muhammad Khan of the Muhammadzai family assumed Ahmad Shah's throne in Kabul his dominion extended less than 100 miles in any direction. Afghan rule had passed out of the hands of the Sadozais, but Kamran Khan, the last of the Sadozais, had taken refuge in Herat where he maintained an independent principality.

In 1831 the Persians at Russian instigation laid siege to Herat, and Britain became apprehensive of Russian intentions. Russian and Brit. missions visited

Kabul, and eventually in 1838 the Brit. Gov. decided to replace Dost Muhammad by Shah Shuja, a previous amir who had taken refuge in India on his fall from power in 1809. This resulted in the First Afghan War and a Brit. force was eventually compelled to withdraw with heavy losses. In 1842 Brit. forces re-entered Kabul, and in 1843 Dost Muhammad was allowed to resume the throne. He continued to reign until his death in 1863. He succeeded in pacifying the country to a considerable degree and in re-establishing control as far N. as the Amu Darya and W. to Sistan. Herat was captured a few months before his death.

Dost Muhammad's successor Sher Ali's rule began in 1863 with a period of strife during which Kabul was lost to rebel forces, only being regained in 1868. Lord Lawrence, who was Viceroy of India at this time, pursued a policy of non-interference in Afghan affairs, but this was abandoned in 1876 on the appointment as viceroy of Lord Lytton, who advocated a 'forward policy' to guard against the threat to India thought to be implicit in Russia's continued advance in central Asia. This policy envisaged placing the Indian defensive frontier on the N. ridges of the Hindu Kush with outposts in the Amu Darya valley, and was to be achieved either by an exclusive alliance with an Afghan amir well disposed to Britain or by the conquest and annexation of as much of Afghan ter. as was strategically necessary. Sher Ali's involvement with the Russian Gov. and his refusal to agree to Brit. demands resulted in 1878 in the Second Afghan War and the subsequent occupation of Kabul, Kandahar, and the Kurram valley. Sher Ali fled, eventually dying in Mazar-i-Sharif.

Occupation of S. A. seemed likely to continue, but for various reasons the Brit. Gov. decided to adopt the alternative of backing a new candidate to the throne in the person of Abdurrahman, who pacified and greatly strengthened the country, kept the Russians at arm's length, and maintained friendly relations with Britain. The desired 'buffer' state was thus created. He died in 1901 and was succeeded by his son Habibullah, who was less favourably inclined towards Britain than his father. He was none the less constrained to accord to the British Gov. full control of Afghan foreign relations in exchange for an ann. subsidy of £160,000 and permission to import munitions through India. He faithfully maintained his obligations and preserved Afghan neutrality during the First World War in spite of Ger. blandishments.

The Amir Habibullah Khan was assassinated in 1919. Thereupon his brother Nurullah seized the reins of power, but was deposed by Amanullah, the third son of Habibullah. Amanullah's troops crossed the frontier of India in May 1919, but were speedily repelled by the Brit. troops, who advanced to Dacca, thereby compelling the amir to conclude peace (Aug.), but with a recognition of Afghan

independence. In 1921 a treaty was signed at Kabul by which Great Britain recognised the internal and external independence of A., and A. accepted the then existing frontier between India and A. subject to a slight adjustment near the Khyber. It was also mutually agreed to interchange diplomatic representatives, including consular officers at Delhi, Calcutta, Bombay, and other tns. By the same treaty A. was permitted to import free of duty such war material as might be necessary to her defence. In 1923 a trade convention was concluded, and though there is no exact information of trade statistics, it is estimated that the exports and imports between India and A. are of the average ann. value of not less than £1,000,000. In 1928 King Amanullah and his queen paid a state visit to Europe, visiting Italy, France, Great Britain, and finally the U.S.S.R. Everywhere they were cordially received, and presents showered upon them, mainly with the object of securing concessions in A. and of furthering divers political interests. Amanullah manifested considerable diplomacy in promising much and doing little, his dominant idea being to westernise his kingdom and to give most, no doubt, to the country which should render him the greatest benefit in this direction. He also concluded treaties of goodwill with Turkey and Persia, by which the different signatories agreed to adopt a conciliatory attitude towards each other in the event of disputes. On reaching his own country again, many reforms were put in train. Afghan students were sent to Europe to study modern methods of army administration and military training, political science, and engineering; and a comprehensive programme of public works, embracing railways and telegraphs and an aeroplane service, was planned at enormous expense for so poor a state. But perhaps the most striking reform initiated was the emancipation of women through the zeal of Queen Surayyeh, who, being a woman of Damascus, was not slow to appreciate the backward state of the women of her royal consort's country. European dress was also adopted by the king's council, even to the familiar European bowler hat. Still more ambitious reforms were the decrees of the king for the abolition of titles of nobility and the curtailment of the powers of the religious leaders, together with a bold attempt to introduce cabinet gov. It is not easy to say which of these drastic reforms caused the most unrest among the tribesmen, but the removal of the veil in public and the education of girls soon inflamed public opinion to danger point. The direct cause of the revolt which followed this westernising zeal, however, was the royal order to all tribesmen to become naturalised citizens of A., and under the lead of the Shinwari tribe, supported by the incensed Muslim priesthood, armed rebels were soon mustering for a general attack. The situation in Kabul became so critical, in spite of the initial defeat of the rebels by the king

himself, that all European residents were evacuated by aeroplanes sent out from Brit. India. Amanullah's position grew steadily worse during the autumn of 1928. His cap. was isolated and severe damage done to numerous buildings. He removed his court to Kandahar and, in a despairing effort to save his crown, deemed it advisable to recant his European doctrines by recalling the Afghan students and giving orders to foreign legations to leave the country. But it was too late, and in 1929 he abdicated in favour of his elder brother Inyatullah. But when the new king abdicated in his turn, Amanullah rescinded his abdication. Meanwhile the rebel leader Bacha-i-Saqao, under the name of Habibullah Khan, had usurped control at Kabul. Amanullah met with no better fortune, and in May fled with his wife and brother to Bombay, whence they journeyed to Europe. In Oct. Habibullah, defeated in his turn, fled from Kabul, which fell to Nadir Khan, former war minister under Amanullah, who later was elected king. This monarch was recognised by the Brit. Gov. and his position seemed to be comparatively secure, but he was murdered in 1933, and his son, Zahir Shad, proclaimed king. The new fundamental law, made in Nadir Khan's reign, declared A. to be completely independent, and, under the same law, slavery and forced labour were abolished and education made compulsory. A. was admitted to membership of the League of Nations in 1934, mainly at the instance of Russia and Turkey. In July 1937 A. signed, with Iran, Iraq, and Turkey, a pact of mutual non-aggression (treaty of Saadabad). In 1938 the Afghan Air Force was considerably expanded and work began on the building of military aerodromes at Herat, Kandahar, Mazar-i-Sharif, and Jalalabad. Plans for the industrialisation of the country were developed in 1939 and already cotton and other textile factories have been opened; while efforts are being made to exploit the almost untapped mineral resources of the N. part of the country. In 1946 A. applied for admission to the United Nations and was accepted.

After the transfer of power in India in 1947 a tense situation arose between A. and the new state of Pakistan. The Afghan Gov. declared all former treaties with the British null and void and staked out a claim for a Pathan state which would include Chitral, the NW. Frontier Prov., and the Pathan area of Baluchistan. The Pakistan Gov. rejected this claim, and by the middle of 1956 no agreement had been reached.

Apart from the brief period of anarchy in 1928-9 relations between Great Britain and A. have remained friendly since 1921, when diplomatic representatives were exchanged for the first time. Soviet relations were relatively close during the reign of Amanullah, who enjoyed the favour of the Soviet Gov. Soviet sympathy and reported military support accorded to him in 1928-9 caused some subsequent coolness, but correct relations

have been maintained throughout. A goodwill visit by Soviet leaders in 1955 was followed by a series of agreements on technical aid to be provided by the Soviet Union. A credit agreement was signed in Dec. 1955 under which A. received 100 million dollars.

Afun Kara Hissar, see **AFYONKARAHISAR**.

Afragola, It. tn in Campania (q.v.), 5 m. NE. of Naples (q.v.), with a trade in wine and straw goods. Pop. (com.) 24,000.

Afranius, Lucius (fl. c. 100 BC), Rom. comic poet, playwright, and orator, who was the first to abandon imitation of the Greeks in depicting Rom. life. Only fragments of his work remain. See O. Ribbeck, *Comicorum Romanorum Fragmenta* (3rd ed.), 1898, and W. Beare, *The Roman Stage*, 1950.

Afreet, or Afrit, see **IFRIT**.

Africa, one of the 5 continents, belonging to the 'Old World,' connected with Asia by the isthmus of Suez, and separated from Europe by the Mediterranean Sea. The name A. was first given by the Romans to their African provs. with the city of Carthage, and it has since been extended to the whole continent. Both Gk and Rom. writers called this continent Libya, and Herodotus (b. 484 BC) and Ptolemy (fl. AD 139) in their works give us information about this land. Herodotus records that Necho, King of Egypt (610-594 BC), sailed down the Red Sea, and in the third year of his voyage returned to Egypt after passing the Pillars of Hercules (Straits of Gibraltar). In the 7th cent. the Arabs were acquainted with the country S. of the Great Desert, and the Arab geographers, the chief of whom are Edrisi, Ibn Batuta, and John Leo (Leo Africanus), have left records which, though often vague and unsatisfactory, show a more extensive knowledge of A. than that possessed by the Greeks and Romans. In the 15th cent. the Portuguese made discoveries along the NW. coast, reaching between 1467 and 1494 as far S. as Sierra Leone, Fernando Po, Cape St Catherine, and the Congo. In 1487 Bartholomeu Diaz discovered the Cape of Good Hope, or, as he called it, the Cape of Storms; and in 1497 Vasco da Gama discovered the Cape route to India. The Portuguese soon made journeys into the interior, and during the 16th and 17th cents. settled along the E. coast. During the 17th cent. the French sent ships to the R. Gambia, and during the end of the 17th and the beginning of the 18th cent. they opened up the country of the Senegal, estab. trading stations, discovered Bambuk to be rich in gold, and obtained new information about the Niger and Timbuktu. The Dutch, the Danes, and the English then commenced to explore. Mungo Park made journeys in 1795, 1796, and 1805, discovering new land around Timbuktu, and sailing down the Niger. In 1822 Denham and Clapperton set out from Tripoli and reached Lake Chad; Laing and Caillie reached Timbuktu; and Richard Lander reached the

mouth of the Niger in Nov. 1830. About the middle of the 19th cent. expeditions were made to Ethiopia, the Upper Nile valley, and N. A., and about the same time attention was turned to S. A. David Livingstone reached Lake Ngami, 1849, went northwards up the Zambesi, and explored the regions round Lakes Nyasa and Tanganyika from 1859 to 1873. Burton and Speke discovered Lake Tanganyika, 1857, and Speke discovered the S. part of Victoria Nyanza. In 1860 Speke and Grant went up the White Nile and reached Gondokoro, and Baker discovered Albert Nyanza. Barth, Gustav Nachtigal, and Schweinfurth explored E. Sudan from 1850 to 1870. Cameron made discoveries in the Congo basin, and Stanley, after exploring the regions around Lake Tanganyika, arrived at the mouth of the Congo in 1877. Serpa Pinto, Thomson, Johnston, Grenfell, Pogge, Wolf, and Wissmann made many discoveries during the latter part of the 19th cent. in the basins of the Nile and Congo. N. A., especially the dist. between Morocco and Timbuktu, has been explored by Oscar Lenz. Grogan and Sharp traversed A. from the Cape to Cairo in 1901.

BOUNDARIES, SIZE, AND COASTLINE. A. is bounded on the N. by the Mediterranean Sea, on the W. by the Atlantic Ocean, on the S. by the Indian Ocean, and on the E. by the Indian Ocean and the Red Sea. Its greatest length from N. to S. is 5000 m., and its breadth from Cape Verde to Ras Hafun is 4650 m. Its area, including Madagascar and the other adjacent is., is nearly 11,500,000 sq. m., or 3 times that of Europe. The coastline is regular, with no deep seas, bays, or riv. estuaries of any size to afford climatic or commercial advantages; so that in proportion to its size A. has less coastline than any other continent, its total length being about 16,000 m.

ISLANDS. A. has very few is., and they are all small with the exception of Madagascar (228,000 sq. m.) which is one of the largest in the world. In the N. Atlantic are the Madeira Is. (Portuguese), the Canary Is. (Spanish), and Cape Verde Is. (Portuguese). Fernando Po (Spanish), Prince's Is. (Portuguese), St Thomas (Portuguese), and Annabon (Spanish) are 4 volcanic is. in the Gulf of Guinea. St Helena and Ascension (British) are solitary rocks in the Atlantic. On the E. in the Indian Ocean are Madagascar (French), Mauritius (British), Bourbon or Réunion (French), the Seychelles, Amirante, and Aldabra (British), Comoro (French), and Zanzibar (Brit. protectorate); and further N. is Socotra (British) and in the Red Sea are Perim and Dahlak.

SURFACE. The continent is an enormous plateau with terraced tablelands rising one above the other, terminating in the rugged mts of the E., where the Nile and the Congo take their rise. The interior plateau is bordered by mt ranges which run parallel with the coast and descend in terraces to it. The Great Desert or Sahara is shut in between the

Atlas Mts on the N. and the S. Plateau, and the Congo basin occupies the W. part of the peninsula. The S. Plateau is much higher than the N., having an average elevation of nearly 4000 ft.

MOUNTAINS. The mts of A. may be divided into 3 distinct systems: 1, the Atlas, 2, the W. Coast, and 3, the E. Coast. 1. The Atlas Mts occupy the N. portion between the sea and the Sahara, from Wadi Daa to Cape Bon. The E. portion, from 6000 to 8000 ft high, consists of 2 parallel ranges enclosing a plateau where salt lakes called shotts are found. The W. portion, known as the Great Atlas of Morocco, has an average elevation of 10,000 ft, and the highest peaks are over 14,000 ft high. 2. The W. Coast System consists of the Cameroon Mts, between 13,000 and 14,000 ft high, and the highlands of Lower Guinea, known as the Kong Mts. 3. The E. Coast System, which is the most important, consists of: (a) The S. section containing the Drakensberg with Mont-aux-Sources, 11,200 ft; the Randberg with Stritzkop, 7500 ft; and the Neuveld, with Compass Berg, 8000 ft. In Cape Prov. is the enormous plateau called the Great Karroo, great plains the total area of which is probably 100,000 sq. m., with a climate as dry and healthy as any in the world. (b) The section between the Zambesi and Ethiopia, containing the highest peaks in A. and the Great Lakes. Kilimanjaro, 19,500 ft, and Mt Kenya, 18,000 ft, are extinct volcanic peaks. The Livingstone Range, near Lake Nyasa, is 11,000 ft high; the Ruwenzori Range ('Mountains of the Moon'), between Lake Albert and Lake Edward, is from 16,000 to 20,000 ft high; and Mt Mfumbiro, between Lake Albert and Lake Victoria, is 11,000 ft high. (c) The Ethiopian System rises abruptly from the coast and gradually descends, and contains Ras Dashan, 15,000 ft, and Abba Yared, 15,000 ft.

PLAINS AND DESERTS. There are 2 great deserts, the Sahara, the largest desert in the world, in the N., and the Kalahari, a sandy rainless region, in the S. The Libyan and Nubian deserts are really a continuation of the Sahara. It must not be supposed that the Sahara and the Kalahari deserts are mainly extensive areas of sand. Thousands of sq. m. are rocky with scrub which can support small antelopes, ostriches, and camels.

RIVERS AND LAKES. Considering its size, and compared with other continents, A. has but few rivs., and her commercial prosperity has been greatly retarded by the want of navigable rivs. with good harbours. Most rivs. are impeded by cataracts. The most important are the Nile, Congo, Zambesi, and Niger. The Nile is of political, historical, and commercial importance, and its overflow is of vital importance to Egypt. The great lakes connected with the Nile are Victoria, Albert, and Edward. The Congo, which drains an equatorial rainy dist., has a constant water supply, and between Stanley Falls and Stanley Pool the riv. is navigable for 1000 m. Lake Tanganyika

supplies the Congo with a considerable amount of water. The Zambesi is the chief riv. in the E., and though navigable in some parts, its course is impeded by cataracts and rapids. The Victoria Falls, the largest in the world, are situated on this riv. The Niger is of great commercial importance, being navigable almost entirely from its source to its mouth in the Gulf of Guinea. The Orange R. is not useful for navigation, though imaginative schemes have been embarked upon to use

on many peaks in Ethiopia. The sides of the mts are in many cases very fertile, yielding different vegetation according to the height. The prevailing winds are from the NE. and the SE. The NE. winds, having come across Asia, bring no rain to N. A. The SE. winds bring moisture to the coastal dists., but owing to the mts it does not reach the interior, hence the Kalahari Desert. The region of the tropical rains extends from 18° N. lat. to 20° S. lat., where the vegetation is



THE ZAMBESI GORGE, RHODESIA

E.N.A.

The railway bridge, whose central span is 650 ft long, is 310 ft above high-water level. Motor traffic can use the bridge.

the water for irrigation and industrial purposes; but the Limpopo, with its mouth just N. of Delagoa Bay, is navigable for about 60 m. The Senegal, Gambia, and Ogoway flow into the Atlantic on the W., and provide navigable waterways for some distance from their mouths.

CLIMATE. Nearly three-fourths of the total area lies within the tropics, under the vertical rays of the sun, so that there is almost perpetual summer with definite seasons of rain and drought. The variations in the climate are caused by the prevailing winds and height. Ruwenzori and Kenya, almost on the Equator, are covered with perpetual snow for 2000 or 3000 ft downwards from their summits, and there is also perpetual snow

luxuriant and the soil productive except in the swamps near the coast.

PRODUCTIONS. The vegetation varies in different parts according to the climate and soil. In the regions bordering on the Mediterranean the olive, fig, orange, and vine are found. In the Sahara the date palm grows in the oases; but the vegetation of this dist. is very scanty. In the Lower Nile valley—the fertility of the soil of which depends on the overflow of the Nile—cotton, wheat, flax, rice, and maize are produced. The Sudan is a pastoral and agric. region. Cattle are reared, and cotton, durra, and maize are cultivated. In the W. dists. bordering on the coasts, and especially in Senegal and Gambia, the palm is found and palm oil is the chief article of export.

The W. equatorial regions consist of dense forest with thick undergrowth, and here the chief productions are palm oil, cocoa, a variety of timber, rubber, and bananas. The chief product of Ethiopia is coffee. The E. plateau produces millet, and the savannahs provide good pasture land. In the S. sheep, goats, and cattle are reared; wool, skins, and meat being exported; and the vine, maize, sugar, and tobacco are cultivated. Of the mineral products, the most important are gold, uranium, diamonds, and platinum; in the production of each the Union of S. Africa leads the world. There are vast quantities of coal, iron, copper, manganese, and asbestos. The occurrences of all these minerals are widespread, but it should be noted that copper is found in abundance in N. Rhodesia and in the Belgian Congo; asbestos in S. Africa and S. Rhodesia; cobalt in N. Rhodesia and the Belgian Congo; gold in S. Africa, S. Rhodesia, the Congo, and to a lesser extent in Ghana, Tanganyika, and Kenya. Ethiopia has gold, platinum, and other precious and base metals, but these have not been exploited in the modern sense. Tin is found in Nigeria, Uganda, and to some extent in Swaziland. There are other occurrences but they do not seem to be important. Diamonds are found in quantities in Sierra Leone, Tanganyika, and Ghana, in addition to S. and SW. A.

FAUNA. The fauna of A. is remarkable. The lion, hippopotamus, elephant, rhinoceros, leopard, hyena, buffalo, and giraffe are common. The crocodile is found in large rivers, and the monkey and baboon are found all over the continent. The zebra and the antelope are equally common; the camel frequents the N. deserts and is also used in the Kalahari. The ostrich is found in both deserts, and has become of commercial value on account of its skin, feathers, and meat which is converted to biltong. Birds, reptiles, and insects abound in great varieties.

RACES AND POPULATION. The pop. is estimated at 150,000,000, but is probably larger. Generally speaking the continent is sparsely populated on account of its great deserts, forest swamps, and arid and semi-arid areas. The most thickly populated areas are the Nile delta, the Lower Nile valley, and the basins of the Congo and Niger. There are pockets in Kenya and Uganda, for instance, that are densely populated; but the S. and extreme N. are not so thickly populated. In this continent are found many branches of the human race: (1) European settlers include Dutch, Portuguese, English, French, Spanish, Italians, Germans, and Turks, who estab. themselves in the extreme N. and S. (2) Asiatic settlers include Hamites, Semites, and Hindus. The Hamites from Arabia settled in Egypt, Nubia, and Libya, but have migrated towards both E. and W. The Semites, also from SW. Asia, followed the Hamites and settled in the Mediterranean coastal dists., the W. Sahara, and the Tibbus in the E. of the Sahara. There are many and distinct indications

of Semitic influence and culture as far S. as Ethiopia. Further N. their descendants are known as Berbers. Hindus are found chiefly in Natal, S. Africa, Kenya, and Tanganyika. The heavy influx of Indians continues. (3) The original natives consist of Negroes, Hottentots, Bushmen (qq.v.), and sev. dwarf tribes. The Negroes are denizens of the forest belts and areas stretching from Senegal to the Niger delta. They migrated over a period of cents. E. and then S., being partially absorbed on their way by indigenous tribes and other invaders from the N. through Ethiopia and Somaliland. The Bantu (q.v.) inhabit S. A. Bantu is a generic term applied to those who have a linguistic affinity. They have a strong infusion of Negro blood, and the most important tribe is the Zulu. Offshoots are found in the Rhodesias, i.e. the Matabele and the Mashona. The Hottentots originally inhabited the SW. coastal dists., and were a nomadic cattle-rearing people. They are light skinned, with high cheekbones, giving them an almost Asiatic appearance. The Bushmen are found in the Kalahari. The inhab. of Madagascar, the Malagasy, are not an African stock, but a branch of the Malay family.

RELIGION. Mohammedanism is the religion of the Hamites and Semites. Christianity prevails in parts of Upper Egypt and Ethiopia, and has been introduced into many parts by the Europeans. Many of the natives throughout A. S. of the Sahara are fetish worshippers and animists, and the vast majority believe in witchcraft in some form or another.

SOCIAL CONDITIONS. It is impossible to generalise. Where grazing is good the natives are pastoralists; but in areas which are semi-arid and where agriculture is impossible, e.g. the greater part of the Somalilands, the natives are also pastoralists and live by their cattle, goats, and camels. In areas such as Ethiopia and Kenya the natives are both pastoralists and agriculturalists according to the nature of the country they inhabit. In areas occupied by Europeans, such as the S., every form of agriculture and animal breeding is carried on, and industrial life thrives, ranging from basic mining to highly developed secondary industry. In other parts, such as Kenya, farming is the main occupation; and again, much depends upon the climate and size of the pop., which determines whether secondary industries are developed. In most parts of A. where European influence is no more than local, primitive conditions persist.

POLITICAL DIVISIONS. Almost the whole of the continent has come under European domination at one time or another. But there are now sev. independent states. Ethiopia was only under European domination for a few years following the It. invasion. Liberia was created a rep. and has remained so. The Sudan is now a rep., and Morocco and Libya are independent states. Somalia, ex-It. Somaliland, has been guaranteed independence by 1960.

French. Algeria, a large part of the Sahara and the Sudan, Tunis, Fr. Guinea, Senegal, the Ivory Coast, Dahomey, Wadai, Fr. Congo, Fr. Somaliland, Madagascar with the Comoro Is. and Bourbon or Réunion Is. belong to the French. The Fr. Cameroons are a trusteeship ter. under the U.N. Following the independence of Ghana, the French have indicated that Togoland will be assisted to the status of an independent state within the Fr. political orbit. Area 3,619,641 sq. m.; pop. (estimated) 5,000,000.

British. The Union of S. A., a dominion; 3 High Commission ters. with slightly differing constitutional relationships varying between colony and protectorate, i.e. Swaziland, Basutoland, and Bechuanaland; the Federation of Rhodesia and Nyasaland, consisting of the protectorates of N. Rhodesia and Nyasaland and S. Rhodesia, which virtually has dominion status. On the E. coast there is Kenya colony and protectorate, Uganda protectorate, and Tanganyika under Brit. administration (a trusteeship ter.). Brit. Somaliland is a protectorate. On the W. coast there is the Federation of Nigeria with which is incorporated the trusteeship ter. of the Cameroons; Ghana, a dominion, Gambia, and Sierra Leone. There are also the small is. of Mauritius, Ascension, St. Helena, Seychelles, Socotra, Zanzibar (a protectorate), and sev. others along the E. coast. Area 4,652,000 sq. m.; pop. (estimated) 73,000,000.

Egyptian. Area 383,000 sq. m.; pop. (1954) 22,500,000.

Portuguese. Madeira Is., Cape Verde Is., Portuguese Guinea, Portuguese W. A. (including Angola), and Portuguese E. A., i.e. Mozambique. Area 794,294 sq. m.; pop. 10,595,850.

Spanish. Sp. Sahara, i.e. Rio de Oro and Sekia el Hamra. Area (estimated) 105,409 sq. m., pop. 13,627, exclusive of 31,000 nomads. Sp. Guinea, including the is. of Fernando Po, Elobey, and Annabon. Area 10,582 sq. m.; pop. (1950) 214,271.

German. Under the treaty of Versailles, Germany relinquished all her colonies in A.

Italian. Following the It. surrender at Gondar, Italy lost her possessions in E. A. Eritrea was absorbed by Ethiopia, and is now a part of the Federation of Ethiopia, and It. Somaliland (Somalia) is now a trusteeship ter. In 1950 the U.N. passed a resolution by which Somalia obtains complete autonomy in 1960.

Belgian. The Congo (q.v.) and Ruanda-Urundi are held under trusteeship. Total area 923,590 sq. m.; pop. 13,000,000.

ANTHROPOLOGY. In the field of pure anthropology the most significant events of recent years have been the finding of a quantity of fossil and animal bones, and the skull and remains of an extinct type of man which was named the *Homo rhodesiensis*, or Rhodesian man, in a deep cave at Broken Hill, N. Rhodesia. The

Rhodesian man is closely related to the Neanderthal man in Asia and Europe. In 1913 a human skeleton was found at Oldanay in N. Tanganyika, which resembled that of a Negro-Hamitic skeleton unearthed by Dr L. S. B. Leakey at Lake Elmenteita, Kenya.

Social Anthropology. Researches in African social organisation have been steadily pursued in recent years, and the work of social anthropologists has added greatly to our information. Such occurrences as the Mau Mau insurrection in Kenya, for instance, provided an urgent stimulus to the study of Kikuyu tribal law and custom, for sev. reasons apart from the desire to ascertain facts regarding traditional views on land tenure. One of the 'weapons' for countering the great strength of the witch doctors, who administered binding oaths on the adherents of Mau Mau, was the administration of other oaths which were supposed to release the oath-taker from his obligations. In such tactics a better knowledge of beliefs and customs was necessary. Again, in 1957, the S. African Gov. introduced legislation to try to curb the practise of witchcraft. But in Basutoland medicine murders persist, and in W. A. human sacrifices, or ritual murder, have not yet been eradicated. Witchcraft and ju-ju (q.v.) are still general. Sorcerers are credited with being able to change themselves into animals; and though there are special laws and punishments for sorcery, witchcraft is recognised as being too deep-rooted in the African social organisation to justify a policy aimed at extirpation, regardless of the consequences to that organisation (see F. H. Melland, *In Witch-bound Africa*, 1923). In recent years there have been serious outbreaks of ritual murder in the Brit. Cameroons by Leopard Men—a secret society associated with ju-ju, whose activities led to mass intimidation. Their method of killing and subsequent extraction from the corpse of various organs showed a remarkable degree of surgical skill.

In any serious consideration of political or social problems in A., S. of the Sahara, including political and economic development, the latent power of the witch doctor over the unsophisticated African should always be borne in mind. For instance, in the organised boycott of the bus services in Johannesburg, in the early part of 1957, intimidation played an important part in maintaining the adamant attitude of the boycotters. In Ghana, just before the Second World War, there was an organised boycotting of the purchase of European foods; and cocoa was burnt by the growers, who refused to sell it at a price which they considered unfair. The Parl. Commission of Inquiry (Cmd. 5845, 1938) pub. a considerable amount of evidence showing that the boycotters were intimidated by threats of supernatural sanctions if they sold this cocoa. The boycott was extremely effective. In organised riots in Port Elizabeth, E. London, and Kimberley, S. A., in Oct.-Nov. 1952, the

power of the witch doctors was again in evidence. Communist inspired, the rioters were not content with looting and destruction of European and Indian property, but also killed. Among the victims was Dr Elsie Quinlan, a nun. She was burnt alive and parts of her body eaten by rioters. Two men and 2 women were subsequently sentenced to 6 months' hard labour for cannibalism (see gov. reports and H. Maclear Bate, *South Africa without Prejudice*, 1956). Mr Arundel Gray Leakey was buried alive by Kikuyu adherents of Mau Mau in Kenya, in furtherance of the demands of the witch doctors. Dr G. I. Jones, Ph.D., completed a report (1950) for the Colonial Office, dealing with one aspect of witchcraft—i.e. medicine murders in Basutoland. There is a great deal of evidence that W. civilisation has done little more than lend a veneer to the indigenous African as a whole. The momentous Tomlinson Report stresses the urgent need and desirability of further Christianisation, and stresses that no other influences for the general good of the people have proved so efficacious in the past or are likely to prove so beneficial in the future. Where the pop. is predominantly Muslim, as in N. Nigeria, the influence of the witch doctors is relatively negligible, although orthodoxy is not generally adhered to. It follows that anthropologists have a tremendous scope for objective and constructive work in many parts of A.

COMMUNICATIONS. The inland communications were very defective before the First World War. Except in the S. and in Egypt there were but few railways; and considering its size A. has but a small amount of navigable waterway. Inland communication is, therefore, carried on to a great extent by means of caravans. Camels are used in the N. and oxen in the S. as beasts of burden. Caravan routes cross the Sahara, the 2 chief being the E. caravan route from Tripoli to Lake Chad, and the W. caravan route from Tafflet in Morocco to Timbuktu. For sev. months in the year there is a weekly bus service from Kano, in N. Nigeria, to Algiers. Thus there is regular communication between the ports of the Niger and Lake Chad and the ports on the Mediterranean. With the help of a few railways and roads, there is natural water communication by riv. and by lake from the mouth of the Nile to the mouth of the Zambesi. The R. Niger and its trib., the Benue, are important means of communication between the Sudan, Nigeria, and the Gulf of Guinea, being navigable for large riv. steamers. The Congo brings the produce of the Belgian Congo to the Atlantic coast; and the Zambesi is navigable for a considerable part of its course, except where rapids and cataracts occur.

Railways. There had long been a project for a railway from the Cape to Cairo, which was to have run as far as possible through Brit. ter. This was a cherished dream of Cecil Rhodes (q.v.). It was, however, politically and physically

impossible. From the N. a railway has been constructed from Cairo along the Nile valley through Aswan, Dendur, Korosko, Wady Halfa, Abu Hamed, Berber, Shendi, to some distance beyond Khartoum. From the S. it has been constructed from Cape Town through to the Federation of Rhodesia and Nyasaland in the N.—with connections to Beira and Lourenço Marques on the E. and to Walvis Bay on the W. coasts. In Kenya a line runs from Mombasa through to Uganda, a distance of just over 1000 m.

Railroad construction has proceeded rapidly since the pioneer work of Cecil Rhodes. Of other than Brit. railways the most important completed work prior to the First World War was the Ger. trunk line from Dar-es-Salaam to Lake Tanganyika (800 m.), opened in 1914. Fr. railroads were not increased to any great extent, but in 1915 a line was completed from the Red Sea coast to the heart of Ethiopia. At Lobito Bay in Portuguese W. A. the Benguela railway has its terminus, a useful line giving the Katanga dist. of the Belgian Congo an outlet to the W. The commercial mind has begun to appreciate that the more practical route is across the continent from E. to W. With the completion of the railway from the Upper Congo at Kabalo to Albertville, on Lake Tanganyika, the first transcontinental combined rail and boat route was an accomplished fact. There is also E. and W. rail communication, though less direct, between Walvis Bay and Lourenço Marques, a 20-m. connection linking up the S. African Union and the SW. African railway systems. In S. A. in 1918 the line from Cape Town via Bulawayo and the Victoria Falls was extended to Bukama on the Luabala R. (Belgian Congo). In the colonies new Brit. railways are opening up and connecting the interior with the coast, though not for any great distance; there are now lines feeding the coal- and tin-mining dists. of Nigeria, a local line from Tabora, on Lake Tanganyika, which is projected to a terminus on Lake Victoria, and an extension of the Uganda railway has been in process of construction since 1921.

Road construction proceeds apace, especially in the Brit. W. African colonies, Uganda, and the Belgian Congo. Telegraphic communication in the course of the last few decades has been considerably extended, and the impulse given to wireless telegraphy by the First World War naturally had its effect in A., where modern high-power wireless stations were installed in E. A., SW. A., W. A., Algiers, etc., before the Second World War.

COMMERCE. The Portuguese were the first Europeans to trade with A., and they had commercial relations with Upper and Lower Guinea; but the Dutch were the first to settle in the S. Here Huguonots came in the 17th cent., but it was not until the end of the 19th cent. that trading relations began to exist between Europe and the interior, when British, Germans, French, Spanish, and Italians

began to settle in A. There is a local traffic between France and Algiers, but otherwise most of the ocean maritime trade of A. is in the hands of the British.

See AFRICA, SOUTH-WEST; ALGERIA; ANGOLA; ASCENSION; BASUTOLAND; BECHUANALAND; BRITISH SOMALILAND; CAMEROONS; CONGO, BELGIAN; EGYPT; ETHIOPIA; FRENCH EQUATORIAL AFRICA; FRENCH GUINEA; GAMBIA; GHANA; IVORY COAST; KENYA; LIBERIA; LIBYA; MADAGASCAR; MADEIRA; MAURITIUS; MOZAMBIQUE; NIGERIA; NUBIA; PORTUGUESE GUINEA; RHODESIA AND NYASALAND, FEDERATION OF; RUANDA-URUNDI; ST HELENA; SAHARA; SENEGAL; SEYCHELLES; SOCOTRA; SOMALILAND, FRENCH; SOMALILAND, ITALIAN; SOUTH AFRICA, UNION OF; SPANISH GUINEA; SWAZILAND; TANGANYIKA; TOGOLAND; TUNISIA; UGANDA; ZANZIBAR; also NEGROES and separate articles on native races.

Bibliography. Leo Africanus, *History and Description of Africa* (trans. 1600 by Jory), 1896; Mungo Park, *Travels into the Interior Districts of Africa*, 1799; W. J. Burchell, *Travels in the Interior of South Africa*, 1822-4; Sir R. F. Burton, *First Footsteps in Eastern Africa: Harar*, 1856; D. Livingstone, *Missionary Travels and Researches in South Africa*, 1857, and *Narrative of an Expedition to the Zambesi and its Tributaries*, 1865; Sir H. H. Johnston, *The Congo, from its Mouth to Bôlobô*, 1884; Livingstone and the Exploration of Central Africa, 1891, and *History of the Colonisation of Africa by Alien Races*, 1905; H. M. Stanley, *In Darkest Africa*, 1890, and *Through the Dark Continent*, 1899; J. Scott Keltie, *The Partition of Africa*, 1893; M. H. Kingsley, *Travels in West Africa*, 1897; E. S. Grogan and A. H. Sharp, *From the Cape to Cairo*, 1900; A. Graham, *Romani Africa*, 1902; C. George, *The Rise of British West Africa*, 1904; R. H. Nassau, *Fetichism in West Africa*, 1904; J. H. Speke, *Journal of the Discovery of the Source of the Nile*, 1906; E. A. Walker, *Historical Atlas of South Africa*, 1922; A. History of South Africa, 1940, and *The Great Trek*, 1948; Lord Lugard, *The Dual Mandate in British Tropical Africa*, 1922; F. Migeod, *Across Equatorial Africa*, 1923; G. McC. Theal, *History of South Africa*, 1925; P. A. Talbot, *The Peoples of Southern Nigeria* (4 vols.), 1926; S. G. Millin, *The South Africans*, 1926; H. Chilvers, *The Seven Wonders of South Africa*, 1932; E. Huxley, *White Man's Country*, 1935; Cambridge Hist. of the Brit. Empire (vol. viii), *South Africa, Rhodesia, and the Protectorates*, 1936; M. Perham, *Native Administration in Nigeria*, 1937; W. M. Macmillan, *Africa Emergent*, 1938; H. N. Devitt, *The Spell of South Africa*, 1938; D. Westerman, *The African To-day and To-morrow*, 1939; G. Tylden, *The Rise of the Basuto*, 1950; J. O. Elias, *Nigerian Land Law and Custom*, 1951; A. Sillery, *The Bechuanaland Protectorate*, 1952; F. J. Pedler, *The Economic Geography of West Africa*, 1955; A. C. Burns, *History of Nigeria*, 1956; Lord Hailey, *An African Survey*, 1957; *The Year Book and Guide to South and*

East Africa (2 vols.), pub. by the Union Castle Steamship Co., is comprehensive and a valuable reference book. The Commonwealth Relations Office and the various dominion gov. offices in London are continually publishing reference works and ann. reports, which are indispensable for research purposes.

Africa, British East, see BRITISH EAST AFRICA.

Africa, German East, First World War. Campaign in. The conquest by the allied forces of this Ger. colony was virtually completed on 27 Nov. 1917, when the Mahenge Force under Col. Tafel, comprising 3500 officers and other ranks, surrendered to Gen. Van Deventer. The residue of the Ger. forces then took refuge in the adjoining Portuguese ter., but were gradually rounded up in the course of the next few months. In pre-1939 area Ger. E. A. was twice the size of Germany, and its conquest by the E. African Field Force under Gen. Smuts and Gen. Van Deventer after a campaign of some 20 months was a triumph of determination and resourcefulness over most difficult conditions. The country was one of almost impenetrable bushlands and desert, abounding in pestilential swamps, and crossed by mt ranges. From the nature of the terrain the difficulties in maintaining supplies were serious, the absence of roads and water in the greater part of the country making the support and transport of large armies, marching ever further from their bases, an extremely harassing undertaking. In a measure these difficulties were common to both antagonists; but the Ger. forces were not only more familiar with the country and consequently in a position to baffle pursuit for a considerable time, but in their retreat over a distance of not less than 1000 m. were approaching ever nearer to their supply bases and food depots. Finally the bulk of the Ger. forces were Negroes, hardened against diseases incidental to the climate and country, while the Allies, who were for ever groping blindly in the bushland after an indigenous and elusive foe, specially trained to the peculiar conditions of African bush warfare, comprised men from the temperate regions of S. Africa, Indian troops from the hills, and troops from the U.K.

The first stage of the campaign, from Aug. 1914 to Mar. 1916, when Gen. Smuts arrived, was the longest and most arduous of all, for the allied troops, being very few in numbers, were always in peril. Not only were they set the task of defending a frontier line of some 600 m., but the military situation was one of ever-increasing anxiety, as on every sector the Ger. forces were in occupation of Brit. ter., the opening attack on the enemy from the sea at Tanga having proved a more or less complete failure. The Ger. forces had between them and Mombasa no force other than a few Arabs under their picturesque chief Wavel (q.v.), while their outpost at Taveta was a direct menace to the Uganda railway, and their garrison at Longido threatened Nairobi, the cap. of Brit. E. A. This stage was

characterised throughout by sporadic fighting, chiefly in the Tsayo region and in the neighbourhood of the Longido line and Ngururhan. At the close of these operations Gen. Sir Michael Tighe, who had taken over the supreme command, made preparations for a general offensive, constructing a new railroad from Voi so as to link up Mombasa with the Ger. N. frontier. At the same time he ran a pipeline from the well-watered hilly districts of Bura to the desert around Maktan. The first battle was fought at Salaita Hill, where the Ger. forces were strongly posted, but the issue was indecisive. In the early part of 1916, when the enemy's forces numbered about 2700 Europeans and 12,000 natives, Gen. Smuts opened the second stage of the campaign with a brilliant attack near Taveta on the one vulnerable point in the enemy's mt line. This action marked the turn of the tide, for Gen. Van Deventer, the rains having set in, sent patrols as far into the enemy's country as Kondo Irangi. So far, however, the E. ter. had not been touched, and it was necessary to drive Kraut's army from the Pangani valley, so as to advance on the Central railway. This was done, but Kraut's force escaped, and it was only after the lapse of 2 months that Deventer was in a position, having reorganised his riv. transport, to advance on the railway. Gen. Smuts meanwhile forcing the passage of the Wami and isolating the chief tn of the colony, Dar-es-Salaam. Following on this success, Gen. Smuts overwhelmed the defensive system of the Uluguru Hills, driving the enemy as far S. as the Rufigi R., in the neighbourhood of which they took refuge during the rainy season. The third stage opened with the problem of dislodging the enemy from the valley of the Rufigi, a task which was accomplished by the S. African Infantry, while at the same time troops landed at Kilwa and elsewhere to drive the enemy from the coastal regions. Then followed a long and very disheartening period of campaigning through dearth of food, almost insurmountable transport difficulties, and the ravages of malaria. About this time Lt.-Gen. Sir J. L. Van Deventer became commander-in-chief in E. A., and thereafter conducted the campaign to its conclusion. By the end of Aug. 1918 the enemy had been repulsed with considerable loss at Lioma and barely escaped from converging attacks E. of that tn. The Ger. commander, Lettow Vorbeck, after the most stubborn fighting in the whole campaign—in the Lindi and Kilwa dists. in the latter part of 1917—had retired across the Rovuma into Portuguese E. A. with some few hundred white troops and about 2500 native troops. The Ger. force having made for the Songea area, Gen. Hawthorn was detailed to get troops there ahead of the enemy. The Ger. commander, who was now at New Utengule, marched further S., despite the vast and impassable swamps of Lake Rukwa, apparently with the object of attacking N.E. Rhodesia, in the hope of obtaining food and supplies.

Early in Nov. the enemy attacked Fife (which stands midway, near the frontier, between Lakes Tanganyika and Nyasa) in force, but was beaten off with loss by the N. Rhodesian Police. Hotly pursued from the N. by the 1st/4th King's African Rifles, he retreated towards Kayambi Mission, reaching Kasama on 8 Nov., Ger. E. A. being thus once more clear of the enemy. The next engagement of the campaign was fought near Kavembe, the 1st/4th King's African Rifles having caught up with half the enemy force at that place. After a stiff engagement the enemy was driven from his position, but all further operations stopped shortly afterwards owing to the news of the signing of the armistice. The last engagement was actually fought on 12 Nov. N. of Kasama, the interruption of the telegraph communications preventing Gen. Van Deventer from getting into touch with the Ger. commander before that date. On the morning of 14 Nov. the Brit. terms, based on Clause 17 of the armistice, were handed to Gen. von Lettow Vorbeck, in accordance with which the latter formally surrendered at Abercorn on 25 Nov. Under Article 119 of the peace treaty Germany, having renounced her overseas possessions, lost Ger. E. A., which was thereafter administered by Britain as mandatory. See also TANGANYIKA TERRITORY. See Francis Brett Young, *Marching on Tanga*, 1918.

Africa, North, Second World War, Campaigns in.

Battle of the western desert (Dec. 1940–Feb. 1941). This battle, resulting in the conquest of Cyrenaica by the Brit. Army of the Nile, began on 9 Dec. 1940, and reached the end of its first stage the following Feb. It was a spectacular achievement of desert warfare, alike in the scientific organisation of the supply services, in its brilliant strategic conception, in the speed and skill of the tactical manoeuvring, and in the remarkable disparity of the casualties sustained by the opposed forces. Five months previously, when, with France prostrate and her Syrian army immobilised, Italy had declared war on Britain and her allies, the threat to Egypt from Italy's army of 250,000 men seemed ominous indeed. The dramatic suddenness of Gen. Sir Archibald (later Viscount) Wavell's successful onslaught on Sidi Barrani, which opened the Brit. offensive, and the rapidity with which the Brit. Army of the Nile captured one stronghold after another until the whole prov., twice the size of Italy, had fallen into their hands, went far to restore Brit. prestige, besides spelling the doom of Italy in the whole war. As early as July, after Graziani (q.v.) had taken over the Libyan command from the deceased Balbo (q.v.), there had been patrol encounters at Fort Capuzzo, and air-raids on the aerodromes of El Adem and El Gubbi, on shipping in the Lt. naval base of Tobruk, and on troop concentrations on the Libyan-Egyptian frontier. Graziani crossed the frontier at Sollum on 13 Sept., drove back

the Brit. forces at Buq Buq, and reached Sidi Barrani on 16 Sept. in pursuance of the plan to strike in the Near E. at the same time that the Germans struck in the W. But the It. offensive was cautious and unimaginative, assuming almost the character of a defensive operation. Instead of boldly advancing, Graziani halted and wasted time on the preparation of a series of powerful perimeter camps. In Nov. the R.A.F. did considerable damage to It. aerodromes in Cyrenaica—an essential preliminary to the advance intended by Wavell. But at this moment Italy invaded Greece and the Brit. Gov. had to send a considerable part of the R.A.F. from Egypt to aid the Gk Army. The projected offensive was therefore delayed some weeks, until land and air reinforcements arrived, which included Australian troops.

The Brit. offensive began in early Dec. with an air attack on the It. camp at Nibeiwa, 15 m. S. of Sidi Barrani, all the It. aerodromes from Derna to Sidi Barrani having been previously so heavily bombed that Italy's total air strength in N. A. was already seriously crippled. Simultaneously with the attack on Nibeiwa, the R.N. bombarded the It. positions at Sidi Barrani and Maktila. The assault on Sidi Barrani was unique in its success. Almost at a single leap, across 75 m. of desert from Mersa Matruh, a strong detachment of Brit. and Australian troops advanced on positions which the Italians had fortified 3 months earlier, and entered the tn. At the cost of only 400 casualties the position fell to Gen. Wilson, together with 38,000 prisoners and stores of all kinds. A few days later Sollum, Fort Capuzzo, and Sidi Omar were captured and the threat to Egypt had gone. Bardia, Tobruk, Derna, Cyrene, and Benghazi all fell in rapid succession, the Italians never having recovered from the initial shock, and by late Feb. Cyrenaica had been entirely conquered and placed under Wilson as military governor. Some two-thirds of Graziani's army had been captured or destroyed, and the remainder hurried into headlong flight to Tripoli. Within 2 months the Army of the Nile had thrown back the Italians from firmly entrenched positions 130 m. inside Egyptian ter. and advanced over 500 m., with steadily lengthening lines of communication, in country practically devoid of good roads, water, and food, and subject to blinding sandstorms. Altogether over 120,000 prisoners were taken. Brit. casualties were less than 2000 in the whole of the operations.

The assault on Sidi Barrani was the crucial action of the campaign. The 4 great It. forts or perimeter camps there each measured about 2 m. in circumference, and they were defended by a ditch, a wall, barbed wire, anti-tank guns, and machine guns. The Brit. heavy tanks moved forward under a barrage and passed right round to the rear of the forts. Broadly, the heavy tanks were used for assault all through the campaign, the light tanks to carry out reconnaissance

and to isolate each successive It. stronghold; and, when the bigger tanks and the infantry saw success assured, the light tanks pushed on to the next objective.

The struggle for Libya: defence of Tobruk. After the conquest of Cyrenaica by Wavell the centre of military gravity shifted to the Balkans and Wavell's Army of the Nile was called upon to supply an expeditionary force for Greece. This depletion of the Nile Army was probably politically necessary: but it foredoomed the Brit. forces left in Cyrenaica. For while Tripoli remained in the hands of the Italians the road to Benghazi lay open to Ger. forces, provided these could be landed unobtrusively further W. and assembled for a determined surprise assault on Benghazi. Ger. armoured formations of first-rate quality were, in fact, landed in N. A. and formed the spearhead of an intended attack on Egypt from the W., to be co-ordinated with indirect attack from the E. through revolt in Iraq. Rashid Ali's *coup d'état* and the Ger. plan to seize Syria utterly failed, however, through the prompt action of the Brit. military commanders, and this in spite of the Ger. success in Greece and Crete. (See IRAQ AND SYRIA.) The Germans under Rommel (q.v.) first made their appearance up the E. coast of the Gulf of Sidra late in Mar., and the real strength of their force was cleverly concealed from the Brit. garrison in Cyrenaica until the road to Benghazi had been overrun. The Brit. garrison withdrew and in a few days the Ger. mechanised troops had captured Cyrene, Benghazi, Derna, and Bomba. By the end of April the enemy was standing about 5 m. across the Egyptian frontier, harassed by light forces of the Brit. armoured units. Tobruk, now isolated, remained in Brit. hands. In all, 4 Ger. mechanised columns were engaged, and in spite of the great length and the exposed nature of his lines of communication, the enemy succeeded in bringing up tanks and heavy motor vehicles.

The defence of besieged Tobruk was a veritable epic in Brit. military annals. The siege was, in fact, a deliberate piece of Brit. strategy invited by Wavell to halt the Ger. movement on Egypt. It changed the face of the campaign by becoming a nodal point of defence obstructing the enemy's lines of communication, and compelling him to maintain a large investing force at Tobruk which could not operate on Egypt. For months the small Eng. and Australian garrison, numbered in hundreds only, defied the armoured power and constant bombing of Rommel's troops.

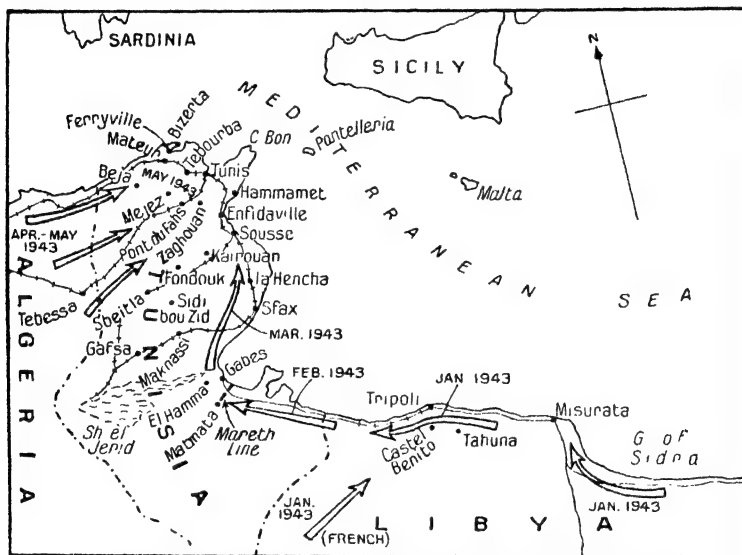
Frequent bold sorties by Brit. patrols were the feature of the next few months. Armoured forces, supported by mobile artillery, inflicted casualties on the enemy almost daily. The growing strength of the Army of the Nile rendered these tactics increasingly effective. By early Sept. the Commonwealth land and air forces standing between the Axis army and the Suez Canal were far more powerful than they had ever been since the war began. These forces included Brit.,

Indian, S. African, Australian, and New Zealand troops, many of whom had already been toughened in hard campaigns. With Axis forces blocked on a line stretching roughly due S. from Sollum the desert was now held by an army and an air force greatly outnumbering those which forced their way to Benghazi in the original Libyan campaign of the autumn of 1940. In July 1941 Auchinleck (q.v.) replaced Wavell.

Throughout this period Brit. submarines, destroyers, and bombers wrought

The It. Ariete Div. was in reserve at Bir el Gobi, some 80 m. SE. of Tobruk. The enemy's main infantry force was strung round the Tobruk garrison.

Second British offensive (Nov. 1941); battle of Sidi Rezegh. The second Brit. Libyan offensive began on 17 Nov. 1941, when Auchinleck opened the attack by the newly constituted Eighth Army under Gen. Cunningham, the conqueror of It. E. A. The Brit. plan was to strike right across the desert with their armoured forces by cutting in between the Ger.



THE NORTH AFRICAN CAMPAIGN: ALGERIA, TUNISIA, AND LIBYA

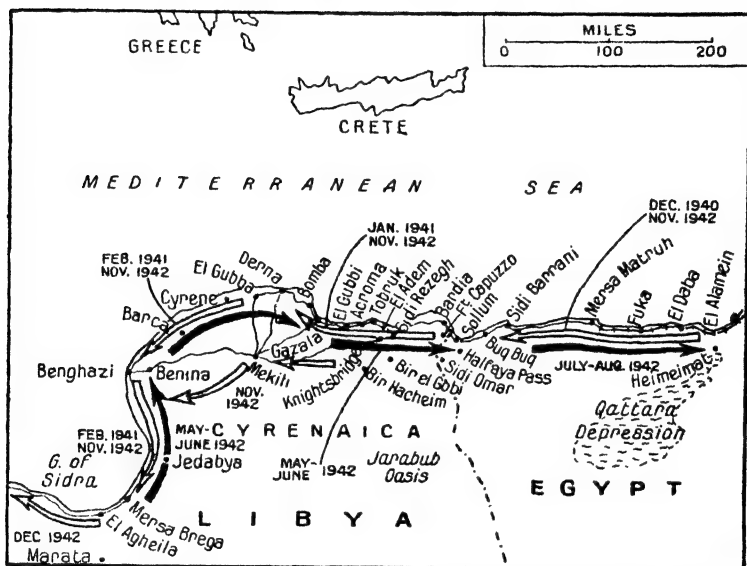
havoc among Axis supply ships, and on buildings, wharves, and moles at Tripoli, Benghazi, and other tus on the N. African coast. It was always evident that each side was now manoeuvring for an attack as soon as climatic conditions permitted. When at length the Brit. did launch their offensive, it was motivated partly by the policy of diverting pressure from the Russian armies defending the Caucasus. And when the offensive was begun Rommel was making his final preparations to reduce the indomitable Tobruk garrison, which had held out for more than 7 months. Rommel's forces, continually reinforced from Italy and Greece, now consisted of 3 armoured divs., the 15th and 21st Panzer and the 132nd Ariete (It.) Divs., and, in addition, a Ger. infantry div. (motorised) and 4 other motorised It. divs. The main Ger. armoured force was SE. of Tobruk, with another panzer div. on the coast some way to the E. of the tn.

tanks around Tobruk and the It. tanks at Bir el Gobi and leaving the strong frontier garrisons behind to be attended to first by mobile infantry and then, later, when the main objective should have been attained, to be reduced at will. The Eighth Army (or Army of the W. Desert) took up its preliminary stations on a broad front from the Jarabub oasis. The attack was launched at nightfall on 17 Nov., and at dawn on the next day the general advance began. As was to be expected, there could be no strategic surprise as in Wavell's victory, for each army fully expected an attack by the other at any time. Moreover enemy aeroplanes were active and the movement of troops in the desert even in ordinary times was difficult to hide. Auchinleck struck at the flank—bearing in mind that the coastal sector had been elaborately fortified by the Germans and Italians—but far to the S. of the point where

Wavell's blow had fallen. In 36 hours Gen. Cunningham's army had advanced 75 m., and very soon its foremost elements had captured the important stronghold of Sidi Rezegh, on the escarpment 10 m. SE. of the perimeter defences of Tobruk. Within the first 5 days New Zealand troops had taken Bardia and Fort Capuzzo, while Indian troops seized Sidi Omar Nuovo. But the hub of operations was the encounter between Brit. and Ger. armoured forces about Sidi Rezegh, SE. of Tobruk, an area of about 40 sq. m.

concentrated round Sidi Rezegh, where the fighting grew hourly more intense and more furious.

For sheer heroism there can have been little in this or any war to surpass that of those Brit. tank crews who, with lighter guns and thinner armour, stood up to and fought off time and again the massive Ger. medium tanks, armed with a gun twice the size of theirs. The attempt to contain the Ger. tanks within the area Sollum-Sidi Omar-Tobruk meant dividing up the Brit. armoured forces,



LIBYA AND EGYPT. ALLIED MOVEMENTS, WHITE ARROWS; AXIS, BLACK

A rough outline of the battle as a whole as it had shaped between 18 Nov. and 23 Nov. shows that when the order to advance was given Indian formations, which were stationed at the coastal end of the line, crossed the frontier and got behind the enemy forts there. New Zealanders, a little farther down the line, performed a similar operation, and went round Fort Capuzzo. Armoured divs., which were farther to the S., went straight ahead and then wheeled towards the coast, holding the Ger. armoured divs., which at the time were operating between Sollum and Tobruk. The tanks met the enemy on the coastal plain round about Sidi Rezegh. The enemy was completely surprised and, from that moment, strenuous efforts were made to prevent him from recovering from this initial blow. The great tank battle of 21-2 Nov. was bloody, but inconclusive. Throughout 22-3 Nov. action was

whereas the Germans could concentrate theirs upon 1 brigade at a time. Rommel's 2 armoured divs. were SE. of Tobruk and SW. of Bardia. Seeing the dispositions of the Brit. forces he moved the larger part of the div. near Tobruk to join that near Bardia, and from the morning of the third day of the offensive this formidable combined div. of light and heavy cruiser tanks was attacking and trying to knock out the Brit. tank brigades 1 at a time. Heavy bombing attacks on enemy tanks and armoured vehicles in the desert were constantly delivered by the R.A.F., and in the first 6 days of the offensive the R.A.F. destroyed 120 Axis aircraft. A bold diversionary raid made by a Ger. tank column towards the Egyptian frontier through one of the gaps inevitable in the long Brit. 'line' penetrated eastwards, crossed the frontier, and reached a point half way between Sidi Omar and Halfaya. Then it was met by Brit.

aircraft and later by ground forces, which destroyed a third of the enemy tanks. On the following days elements of the main Brit. forces joined detachments advancing from long-beleaguered Tobruk. All through there was the most bitter fighting for Sidi Rezegh, the focal point of the tank battles.

Rommel's German Afrika Korps. By the end of Nov. the battle had resolved itself into 3 main areas, but, as at the beginning, the main and by far the most important front was the tank-strewn area round Sidi Rezegh. Ger. armoured forces and motorised infantry penetrated the Brit. positions on 1 Dec., only to be thrown out again after extremely bitter fighting. The It. Ariete Div., after losing half its remaining tanks in a violent action E. of Sidi Rezegh, fled northwards with Brit. forces in hot pursuit. Brit. bomber and fighter aircraft always retained mastery of the air. It was found, however, that in the 1600 sq. m. of desert over which fighting raged, the air arm was robbed of a great part of the importance it had attained in a land of roads, railways, and large tus; for tanks in the open proved that they could not then be dominated by the air arm. Only armoured aircraft carrying quick-firing cannon were likely to reassert the authority of air fleets over land fleets. It may here be pointed out that the Germans had been specially trained as colonial troops. In Mar. 1941 the Ger. counter-offensive in Cyrenaica had been undertaken mainly by the specially trained Ger. Afrika Korps (q.v.), not an improvised organisation but the product of large-scale work by certain depts of the Ger. general staff. It was Afrika Korps troops that had made their dramatic appearance at El Agheila on the Gulf of Sirte in Libya late in Mar. 1941.

Siege of Tobruk lifted. During the intense tank battle at the end of Nov. in the area about Sidi Rezegh and Bir el Hamed, where the Germans made a desperate effort to break westwards through the Brit. and New Zealand troops, Gen. von Ravenstein, commanding the 21st Armoured Div., together with 610 other Ger. officers and men, was captured. Meanwhile Brit. mechanised patrols had reached the coast S. of Benghazi; while in the S., at Jalo, another force was preparing to strike N.-westward to the coast. Rommel now threw all his remaining armoured forces into the fighting round Sidi Rezegh, and succeeded in breaking through the Brit. corridor, and again cutting off Tobruk. At this juncture both sides paused to refuel but the battle was soon rejoined, and Rommel was again defeated near El Gobi and the Tobruk supply line was restored. The loss of this area was a blow to Rommel, whose tanks were now being driven W. To the E. of the chief battlefield the greater part of the country between the Tobruk-Bardia road and the El Gobi-Sidi Omar road was now cleared of the enemy, though Bardia itself still remained in Ger. and It. hands. In the central Mediterranean many blows were struck at the

enemy's sea-borne supplies, loaded supply ships and tankers carrying petrol and ammunition being frequently torpedoed, bombed, and sunk. The siege of Tobruk was lifted by 10 Dec.

The battle had now been in progress for over 3 weeks, but the quick decision hoped for by Auchinleck had not been obtained. Brit. tank losses had been severe, and the battle had not progressed according to plan, the armoured battle being inconclusive; and, but for strong pressure at Tobruk, the full force of the Ger. motorised infantry would have moved on Bardia to relieve the encircled garrison and thus have jeopardised the whole Brit. offensive.

Rommel's forces in retreat to Jedabya and El Agheila. British close in on Halfaya. The beginning of the third phase came with the storming of El Adem, on the escarpment due S. of Tobruk and 20 m. W. of Sidi Rezegh. Striking along the coast the New Zealanders from Tobruk soon reached Gazala, while other Indian and Brit. troops pushed up from the S.E.; and on the S. flank Brit. columns continued a slow but steady advance, mopping up enemy positions in their progress. After 5 days of intense fighting, in which all his remaining forces were flung into the battle, Rommel's front in Libya was broken, and his forces were in retreat.

But though the enemy had been driven out of the positions which barred the Brit. advance westward—with the exception of Bardia, Sollum, and Halfaya—his forces were far from destruction. The Brit. offensive was handicapped by the growing problem of transport over great distances of desert terrain. Cyrene and Apollonia were taken on 21 Dec. and by the 22nd the Eighth Army, now reinforced, were heavily pressing It. forces covering Benghazi, while Brit. mobile columns reached the coastal plain on the Gulf of Sirte, S. of the cap. Along this plain Rommel's Afrika Korps were retreating in some disorder, abandoning large quantities of war material. Benghazi was entered on Christmas Eve by the Royal Dragoons after it had been evacuated by the enemy. The enemy's main forces under Rommel were now in the Jedabya zone, where they were striving to repulse Brit. columns advancing from the S. Bardia was recaptured on 2 Jan. by S. African troops, supported by Brit. tanks, and over 1000 Brit. prisoners of war were thereby released. Nearly 8000 Axis prisoners, including 1000 Germans, were captured.

The Brit. forces (under the command of Gen. Ritchie, who had succeeded Sir Alan Cunningham in Dec.) had covered over 400 m. in their advance across the country, which had occupied 6 weeks. The heaviest toll had been taken of the enemy, and the war booty captured was enormous. On 6 Jan. It. infantry of the Trento Div. and the remnants of the Ger. Afrika Korps rallied on a line running S. from Jedabya, hotly engaged with Brit. troops of the Brigade of Guards. While Rommel was being

barred here, and in his subsequent retreat on El Aghella, Brit. forces had taken Sollum and were closing in on the exceptionally strong positions at Halfaya. The importance of the Halfaya positions to the enemy, and also to the Brit., was that they commanded 2 of the shortest roads from the coastal belt at Sidi Barrani and Sollum on to the escarpment.

Rommel, having been pushed out of Jedabya, now made a stand between Aghella and Marada, where a series of broad wadis provided a natural obstacle, and from that time (mid Jan.) he consolidated his positions while awaiting reinforcements.

Four months' lull. Rommel's counter-attack. There now followed a period of some 4 months of uneasy quiescence, during which there were intermittent patrol activities and air-raids. But behind these minor exchanges strenuous efforts were being made on both sides to reinforce and re-equip the opposed armies. On 26 May the storm broke. Rommel launched the Afrika Korps to the attack, his object being to defeat the Brit. armoured forces and to retake Tobruk. Probably the remoter objective was an advance on Suez concurrently with a break-through by the Ger. armies to the Caucasus. The Brit. Command, through air reconnaissance, had foreseen the attack, and the Eighth Army under Ritchie was fully prepared to meet it. The Brit. air forces opened a counter-offensive on the 21st Ger. Armoured Div. with heavy attacks against enemy forward aerodromes. On the night of 26-27 May the Afrika Korps passed to the S. of Bir Hacheim, moving N. with great rapidity towards Acroma, and also towards the old battlefields of El Duda and Sidi Rezegh, which were actually reached by some of its most forward troops. These were soon driven off by Brit. armoured forces. On the same night the enemy attempted a landing from the sea near Acroma, but was driven off by Brit. naval forces. Long before they approached El Adem, which is near Tobruk, or Acroma, the Axis armoured and motorised troops were brought to action by the 1st and 7th Brit. Armoured Divs., together with Brit. heavy tank brigades.

'Battle of the Cauldron': French defence at Bir Hacheim. The full brunt of the enemy initial advance to the E. of Bir Hacheim was taken by the 3rd Indian Motor Brigade Group, which was overborne by sheer weight of metal, but not until after it had inflicted heavy losses on the enemy. Meanwhile an attack on Bir Hacheim had been beaten off by the Free Fr. forces, with enemy losses. Rommel's attacks on the N. front of the Brit. main positions S. of Gazala, launched on the 27th, achieved little. Throughout 28, 29, and 30 May there was very heavy and continuous fighting between the Brit. armoured divs. and brigades and the Ger. Afrika Korps, backed up by the It. Mobile Corps. The battle swayed backwards and forwards over a wide area, from Acroma, in the N.,

to Bir Hacheim, 40 m. to the S., and from El Adem to the Brit. minefields, 30 m. to the westward. On 2 June an enemy column 18 m. long, headed by 60 tanks and containing 2000 motor transport vehicles and lorried infantry, and strongly supported by artillery, swept round Bir Hacheim in a SW. direction, and headed for the Brit. positions in the 'Cauldron,' an area lying between the gaps in the minefields. A series of exceptionally fierce engagements took place. An attack launched by Rommel's main armoured forces against the Brit. positions known as 'Knightsbridge' was stopped by Brit. and Indian infantry and artillery, and the enemy was driven back westwards. After nearly 2 days of furious fighting the first phase of the 'battle of the Cauldron' ended in a definite Ger. repulse; while in the S. the Free French, now surrounded at Bir Hacheim, held fast against almost continual attacks. This third Libyan campaign was waged by the Brit. Command on different lines from the previous encounters. This time Auchinleck was content to let his adversary take the offensive in the hope that he might whittle away his armoured strength by a succession of attacks on rock-like defences, and in mighty but fruitless battles with the greatly strengthened Brit. armoured units.

Rommel captures Tobruk. At this stage the course of the battle swung sharply against Ritchie's army. Ritchie's counter-attack on 4 June on Rommel's forward base in the Brit. minefield area was premature, and the Brit. forces were compelled to fall back before a fierce counterstroke and suffered considerable losses. Rommel was therefore able to concentrate his attention on Bir Hacheim. Ritchie tried to lift the pressure on this position by using mobile troops and intense air support, but on 10 June he decided that the risk of maintaining this isolated garrison was too great, and it was withdrawn. With the fall of Bir Hacheim the investing enemy forces were released for co-operation with the forces preparing to attack in the Knightsbridge-El Adem area, and 3 days later the Brit. had to abandon some positions there, which opened the way for Rommel to break through to the coast and try to cut off the 1st S. African and 50th Divs. in their position S. of Gazala. Rommel continued to press his attack in the El Adem area and estab. himself E. of the El Adem defended local area at Sidi Rezegh. After 4 days of the fiercest fighting Ritchie on 17 June withdrew his army to the El Adem-El Duda-Sidi Rezegh area, and concentrated his main forces towards the frontier, leaving a garrison in Tobruk. This proved disastrous. Rommel wheeled sharply round westward, and on 20 June attacked Tobruk from the SE. The attack on the Brit. garrison at Tobruk began in earnest with panzer thrusts of considerable ferocity and dive-bombing Stukas following a particularly heavy artillery barrage. Scratch units formed of engineers, men of the Ordnance Corps and Army Service Corps, together with

S. Africans, fought with desperate bravery against the most hopeless odds both in men and material. The Brit. and S. African forces retired inside the tu and put up a gallant fight, hurling back attempt after attempt of the Germans and Italians to enter the tu. Then dusk fell. Under cover of darkness the enemy crept up, entered the streets, and began to force the defenders out of the houses with grenades, Tommy-guns, and machine guns. House-to-house fighting ensued, and the garrison was forced to surrender, 28,000 prisoners being taken by the enemy, together with much material.

Explanation of the British defeat. Superiority of the German tanks and anti-tank guns. Thus for the third time in 2 years a Brit. force suffered a reverse in Libya, and each time the reverse followed what had appeared to be substantial victory, the enemy in the first 2 battles being driven back to the border of Tripolitania. In all the battles the fighting took place at great distances from bases, and not only was the vast battlefield barren, waterless, and uninhabited, but it contained only 3 natural defensive positions, and these were coastal tus. The only way to win a desert success on such a terrain was to assemble a force strong enough to defeat the enemy's armour so thoroughly that there was none left to get away. But in this, as in the 2 previous battles, the Brit. armoured force was inadequate for this task. With the armoured forces nearly equal in mere numbers, as was the case in this third battle, the decisive factor was hitting power. Apart from some serious blunders in tactics, the main reason for the Brit. reverse was the fact that they were out-gunned. The new Gen. Grant (Amer.) tanks carried excellent 75 mm. guns, but the bulk of the Brit. force consisted of tanks armed with a 2-pounder gun, which was useless against Ger. tanks equipped with at least a 47-mm. gun. It was his contempt for the Brit. tanks that led Rommel to make his confident sweep northwards in the opening days of the battle, and though the Grants were a surprise, they were not in sufficient numbers to prove decisive. The fact that victory so long seemed within the Brit. grasp was due to an improved recovery of damaged tanks, and to the commanders' skill and courage in individual encounters. Again, Rommel had the advantage in anti-tank guns, and showed much cleverness in their use.

But the Brit. reverse was not to be assigned entirely to the undoubted if temporary inferiority of their mechanised arms: for Ritchie still held Rommel's forces, and could still hope to win, until 13 June, when the main Brit. armoured force ran into an ambush, and of the 300 tanks with which the Brit. commander started the day only 70 (excluding light tanks) remained by nightfall. In those few hours the battle was lost, and lost on the spot, thus illustrating the truth that, in these mechanised desert battles, one false move or one brilliant tactical stroke might turn the course of a campaign.

Rommel's advance on the Nile checked. The fall of the fortress compelled Auchinleck to fall back before a victorious and better-armed foe to Mersa Matruh. Flushed with success Rommel now gathered his forces for an advance on the Nile delta (3 July), but his advance now received a very definite check at El Alamein. Having regrouped and replenished his tanks Rommel returned to renew the assault, but in a different direction, this time swinging his armoured forces NE., while his coastal columns attacked from the W. in the expectation of smashing the Brit. infantry in the Alamein 'box.' But the Brit. commander immediately turned his forces N. and went in against Rommel's flank and rear. The fighting that ensued was fierce but short-lived, and before dusk the Axis forces withdrew from the ridge to the S. of the Brit. positions, whence they had hoped to out-flank the defence. Every day of successful resistance and counter-attack served to reduce the peril to Egypt. Moreover the allied air forces, whose co-operation with the land and naval forces was growing daily closer, were now increasing their attacks to a scale unprecedented in the Middle E. For a vital change had come over the desert battle. The Axis momentum had spent itself.

Churchill visits Egypt. Appointment of Gens. Alexander and Montgomery. Before the fall of Tobruk most of the 6-pounder guns which were to be used in the coming battle had been dispatched, together with the more heavily armed and more heavily gunned Brit. tanks; while, in addition, Roosevelt sent over a number of Sherman tanks and a large number of self-propelled 105-mm. guns for contending with the Ger. 88-mm. high-velocity guns, all of which were destined to play a recognisable part in the forthcoming battle of Egypt. It was essential to bring the Brit. Eighth Army into a condition to regain the initiative and to resume the offensive, this being an integral part of the Allies' whole N. African strategy. By rearming the men on a gigantic scale, the disasters of the summer were eventually repaired and the defence of Egypt converted into a successful attack. Churchill, having visited Egypt, decided to make changes in the higher command, and Alexander (q.v.), the defender of Burma, replaced Auchinleck, who was later transferred to India, while Montgomery (q.v.) was appointed to command the Eighth Army. On 10 Aug. Churchill gave Alexander the instruction to take or destroy at the earliest opportunity the Ger.-It. army commanded by Rommel, together with its supplies and establishments. Intensive preparations were made behind the Brit. lines in face of an imminent attack by the Axis army. Rommel delivered his attack on the Eighth Army, which was now reinforced by the 44th Div., on the night of 30-1 Aug. Pivoting on the Italians in the coastal area he came round the Brit. open S. flank, which had been left free of the Qattara Depression in order to allow liberty of movement in the event of a turning operation, with the whole

Ger. Afrika Korps, including the 90th Light Div., 2 panzer divs., and a large part of the 20th It. Motorised Corps.

Renewal of the struggle at El Alamein. *Rommel driven back.* Rommel found himself confronted with stiff resistance and with artillery used on the largest scale and abundantly supplied with ammunition. After 3 days he withdrew with heavy losses. Rommel could ill afford losses, for he had been much hampered by the sinking of his supply ships by Brit. submarines and by Brit. and Amer. air attacks from Malta and Egypt. The heaviest fighting took place between Heimeimat, near the Qattara Depression, and the Ruweisat Ridge in the left centre of the Brit. line, and Rommel was forced to fall back slightly. The Brit. commander of the Eighth Army had wrested the initiative from Rommel by this date (2 Sept.), and 4 days later Rommel had been driven back to his starting point. Wherever he probed the Brit. lines for a weak spot he was hurled back with losses. During the whole attack, especially on 2-3 Sept., the Axis made air attacks on the biggest scale, sev. raids being carried out by as many as 100 aircraft, each time meeting with severe reverses.

The British victory of El Alamein (23 Oct.-7 Nov. 1942). By late Oct. Alexander was ready to pass to the offensive. There followed one of the most glorious victories of Brit. arms. It was realised by the Brit. Command that the enemy was converting the position in front of the Brit. line into a fortress, blasting gun-pits and trenches in the solid rock, and laying enormous and elaborate minefields. An attack round Rommel's S. flank would have led into difficult terrain, and was therefore impracticable. Yet, on the other hand, a frontal attack was a most formidable operation. It was, however, decided to attack frontally by putting up a terrific artillery and air barrage under cover of which the infantry would advance and clear the minefields for the subsequent advance of the armoured units, and these tactics were completely successful. On a 6-in. front of attack the Brit. had a 25-pounder gun or heavy weapon every 23 yds; it was necessary to effect penetration of about 6000 yds at the first stroke in order to get through the minefields, trenches, and batteries of the enemy, and this was successfully achieved, the Brit. and Amer.-manned air squadrons contributing signally to the successful operation. This aerial ascendancy was used with the most devastating effectiveness. Heavy blows, too, were constantly struck at Rommel's supplies by the navy. The Brit. naval and air forces sank 50,000 tons of Axis shipping over these few days. On 29 Oct. there was a big-scale encounter between opposing tanks, the Axis forces being driven off with considerable losses, and Brit. gains being held while tank losses were slight. From the moment that the seaward flank of the enemy was broken and the great mass of the Brit. armour flowed forward and successfully engaged the panzer divs., the fate of the

Axis troops to the southward, and to 6 It. divs., largely motorised, sealed. As the Brit. advance reached Daba, and later Fuka, the enemy's line of supply and retreat were equal, severed. They were left in a waterless desert to perish or surrender. Tactically the position had grown serious for Rommel on 1 Nov., when a corridor W. of Tel-el-Eisa was enlarged, and a lane cleared for armoured formations which were at last able to advance on to open ground. Thereupon Brit. and Indian troops advanced rapidly and soon widened the already formidable gap in Rommel's lines. The Axis retreat, which had begun methodically on 3 Nov., first N. of the Qattara Depression, had by 7 Nov. become a rout.

Halfaya Pass and Tobruk recaptured. Cyrenaica overrun. When this remarkable battle opened the Afrika Korps front line army was composed of some 100,000 mixed Germans and Italians with nearly 700 tanks, of which possibly two-thirds were It., and a very strong army of artillery and anti-tank guns. Well over half these tanks were totally destroyed or knocked out or captured, and the remainder were picked up in deserted workshops in the rear areas, 46 being found at El Daba. The majority of the guns (over 1000) were either destroyed or captured. Von Stumme, who had commanded the Axis forces during Rommel's brief absence in Berlin, was killed. Ritter von Thoma, commander of the Afrika Korps, and numerous other senior Ger. and It. officers were taken prisoner. By mid Nov. the number of Axis losses in men was more than 70,000. The Brit. casualties were 13,600. The race for the Libyan ports had now begun. Halfaya Pass fell a few days later, and Tobruk was once again in Brit. hands by 13 Nov.

Within a few days Sollum and Bardia were also in Brit. hands, and within 4 weeks from that time the Eighth Army had overrun the whole of Cyrenaica. While Brit. engineers were effecting repairs to the Benghazi (q.v.) docks to render the port practicable as a supply base, Montgomery's forces pressed hard on the heels of the Ger. Afrika Korps. In the last week of Oct. Rommel reached the powerful natural position of El Agheila, where, having received reinforcements, he hoped to concentrate his reorganised forces for resistance. But on 13 Nov. the Brit. Eighth Army outmanoeuvred him and turned his forces out of their strong positions at Mersa Brega, just E. of El Agheila, at little cost to themselves. Rommel's forces then renewed their retreat westwards, relentlessly pursued by the Brit. forces. Allied fighter-bombers, operating on an unprecedented scale, were employed to harass the enemy in his retreat, Axis air activity being entirely ineffective in preventing these operations.

Anglo-American landing in French North Africa. U.S. and Brit. forces landed in Fr. N. A. early on the morning of 8 Nov. 1942. The city of Algiers at once surrendered, and thus paved the way

for the occupation of the surrounding area. The only serious resistance was from navy and coast defence artillery, the mass of the Fr. armed forces having no wish to oppose the entry of Amer. troops. Brit. naval forces of great strength covered the expeditions. The landing forces, which were under the command of Lt.-Gen. Dwight D. Eisenhower (q.v.), commander of all Amer. troops in the European

allow Amer. forces to pass through Tunisia. Giraud, who had escaped from a Ger. prisoner-of-war camp and, later, from Vichy France, arrived in Algeria to assume the leadership of the Fr. movement and to organise the Fr. N. African army to fight beside the forces of the Allies. In a broadcast to the commanders of the Fr. fleet at Toulon Darlan (q.v.) asked them to bring the fleet over to N. A.



Imperial War Museum: Crown Copyright

EL ALAMEIN TO EL AGHEILA: 750 MILES IN THREE WEEKS
Crusader and Sherman tanks pass through Mersa Matruih.

theatre of operations, was led by U.S. Rangers in separate parties at strategic points, followed by armoured infantry and small numbers of marines and blue-jackets. Parachute troops seized vital airports and communications. Aircraft from carriers and heavy units of the Amer. and Brit. navies covered the landings. The landing parties swept inshore off the beaches near Algiers and Oran, capturing 3 air-fields. Resistance from coastal batteries was dealt with by allied naval forces under the supreme command of Adm. Sir Andrew Cunningham (q.v.). The capture of the naval base of Oran virtually ended all Fr. resistance in the Mediterranean. The immediate objective of the allied forces was Tunis, and Roosevelt requested the bey of Tunis to

Darlan's assassination soon afterwards left Giraud as the sole leader. This great N. African enterprise was planned in April and July 1942, when Marshall, head of the Amer. Army and Air Force, visited London with King, Commander-in-Chief of the U.S. Navy. Detailed negotiations with anti-Axis elements in N. A. were conducted by Clark, deputy-commander to Eisenhower, together with 3 Brit. and some Amer. officers, who met in a lonely house on the coast. The expedition, and indeed all the participants in this preliminary conference, narrowly escaped capture by the Vichy police.

The Tunisian campaign opens. Eighth Army's pursuit of Marshal Rommel. Fall of Tripoli. In the early days of the Tunisian campaign Brit. infantry

and artillery, on 17 Nov., reached the important pass at Djebel Aboid in the N., and, in their first rush after landing at Algiers, it seemed as if the Allies might capture Tunis without difficulty. Then the Germans, having landed heavy reinforcements and supplies from Sicily, stiffened their resistance. A general advance of all the allied forces in Tunis in co-operation with the Eighth Army under Montgomery now depended on the speed with which that army could advance into Tunisia. Advanced elements of the army cut Rommel's retreating columns in two at Wadi Matratin (50 m. W. of El Aghella) on 17th Dec., but the Germans succeeded in breaking out of the flanking trap. With the possession of advanced air-fields in Tripolitania the siege of Malta was virtually ended, and towards the close of Jan. the island's aircraft were co-operating in the Brit. offensive in Tripolitania. On the road to Tripoli the Ger. rearguards fought stiff delaying actions, notably near Tarhuna and Castel Benito. The Brit. flag was hoisted in Tripoli on 23 Jan. 1943—a symbolic act which in effect marked the end of Mussolini's colonial empire—but the Eighth Army passed rapidly on, Montgomery's aim being to come to grips with Rommel's army. Rommel left all along the road of his retreat—the longest known in military hist.—strong rearguards and minefields to hold up the Brit. advance. There was now no doubt that he would stand and fight along the Mareth line, 200 m. W. of Tripoli. This line was a strong series of connected defences, on the pattern of the Maginot line, which some years previously had been constructed by Fr. engineers, no doubt with the intention of holding Tunisia against any possible attack by the Italians. It started on the coast in the Gulf of Gabes, and extended through Mareth to Matmata (a length of 20 m.). At the W. end were deep wadis, and a chaos of hills offering strong vantage points for defence.

Rommel attacks at Sejenane and joins forces with von Arnim. Rommel takes the Kasserine Pass. Allies regain the initiative. The purpose of the Allies was to end Ger. occupation of N. A. as speedily as possible, particularly as the Germans were still able to land reinforcements and guns and tanks at Bizerta. To accomplish this purpose the Brit. First Army under Anderson must advance in the N. of Tunisia through Mateur to Tunis, and attack the forces of von Arnim. Further S. the Americans had Gafsa and Maknassi as their immediate objectives. Fr. forces were to co-operate, and the whole conception of the allied thrusts was to deprive the Axis forces of their control of the 'corridor' extending between the sea and mts from Gabes to Tunis, and to drive them into the sea. With Montgomery's arrival on the S. border of Tunisia in mid Feb. the other allied armies now had some opportunity of driving against the flanks of the road up which Rommel's Afrika Korps must if engaged and defeated at the Mareth line withdraw. But the Axis forces took the initiative on 14 Feb.,

when they began a twofold thrust towards the W. and NW.—through the Faid Pass against Sidi Bou Zid, 70 m. W. of Stax, and in the direction of Sbeitla, 60 m. W. of Sidi Bou Zid. Early in Mar. the Axis forces made repeated attacks in the Sejenane area and gained ground, though at heavy cost. It was soon clear that Rommel's long retreat had been skillfully executed, though harried the whole way by the Eighth Army and the R.A.F. In Tunisia he succeeded in joining hands with von Arnim and completing the occupation of a broad belt of ter. stretching from Tunis to the S. frontier, and he was now trying to seize the initiative by striking at first one foe and then another, while his adversaries, who, apart from the Eighth Army, had but small forces, had to withdraw into the mountains to regroup, having failed to pin Rommel against the coast. Following up his success Rommel captured the Kasserine Pass, 20 m. W. of Sbeitla, and then attacked at the pass of Sbiba, which was held by Brit. units of the Brigade of Guards. But these were temporary and comparatively slight reverses, for soon Rommel's detached forces N. of the Mareth line were hurled back through the Kasserine Pass and retreated on Gafsa. The plan to cut through Anderson's lines in N. Tunisia, and turn his positions from the sea to Jebel Mansone, was foiled with heavy losses, but the Germans persisted in their attacks. On 6 Mar. Rommel's infantry and tanks delivered 2 heavy attacks against the Eighth Army in the Mareth area, but the Germans suffered severe casualties, those of the Eighth Army being negligible. In other parts of Tunisia Axis offensive efforts were now being relaxed, and the Allies, after a long setback, had at last regained the initiative.

Battle of the Mareth Line. On 20 Mar. Montgomery attacked the Mareth line by a frontal and 2 flank attacks. The frontal attack began with hundreds of guns pouring tons of explosives on a sector less than a m. wide. Simultaneously with this, the main attack on the centre of the Mareth line, Brit. forces pierced the Axis coastal flank, and carried out another diversionary flank movement on El Hamma, 20 m. behind the Mareth line. There was desperate fighting for the Ger. stronghold by the Wadi Zigzaou. Crossing the Ger. minefields under intense fire Brit. troops spread into the wadi, crossed the ravine under cross fire, and clambered up the bank of the wadi with scaling ladders. But, although they estab. a bridgehead for a time in the Mareth line and took 3000 prisoners, they soon afterwards lost the bridgehead to a strong counter-attack by the pick of Rommel's troops. On 23 Mar. Montgomery transferred the main weight of his attack round the Matmata Hills, throwing in infantry and tank forces to support the outflanking units which had already been engaging the enemy behind the Mareth line SE. of El Hamma. While this change of plan was being carried out the Mareth forces continued to fight a holding battle, creating as best they could the illusion

that the battle for the bridgehead would be renewed. The capture of a dominant hill (known as Hill 184), which denied to the enemy any distant view of the broad amphitheatre between the Jebel Melab, 15-20 m. S. of El Hamma, and the Jebel Tebaga running to the N.E., in which it was intended to draw up the Brit. forces, was effected after the decision to switch the main attack from the centre, and was a vital part of the plan. The plan was to surprise the enemy by violation of the usual rule of attack by night and give him no time to make fresh dispositions. The R.A.F. started the attack on El Hamma at 2 p.m. on 26 Mar., and 2 hrs later the barrage of medium guns, howitzers, and 25-pounders opened. At the same time tanks and infantry went into action. By next day the Germans were caught between the hills to the E. and the allied forces, with no escape except towards the Mareth line, which by now was crumbling, or northward through Gabes. By the 28th the Eighth Army was in possession of the whole of the strongly organised defences of the Mareth line, the Axis forces withdrawing at great cost of tanks, guns, motor transport, and men (8000 prisoners), and retreating through Gabes, which was then being bombarded by Brit. warships.

British victory of Akarit. Eighth Army contacts American forces from Gafsa, Sfaz, Kairouan, and Sousse taken. Rommel's forces escape northward. The allied attack on Tunis and Bizerta. The Axis defeat at El Mareth was soon followed by another defeat at the hands of the victorious Eighth Army at Akarit, a very strong position N. of Gabes. In pitch darkness on the morning of 6 April some 500 Brit. guns opened up on the position. Under cover of the barrage Brit. and Indian infantry overwhelmed the surprised Axis forces, seized all key points, and estab. a bridgehead. A hole having thus been blasted in the centre of Rommel's defences, the Brit. tanks streamed through, chasing the retreating foe towards the N., and by nightfall of the same day the open country had been reached, and over 6000 prisoners taken. At the same time the Eighth Army made contact with the 2nd U.S. Corps from Gafsa. Four days later Montgomery's forces seized Sfax (90 m. N. of Mareth), and continuing a relentless pursuit were soon beyond La Hencha on the way to the port of Sousse. The air offensive was playing an even greater part in the operations than ever before. Cagliari had been heavily bombed some time previously, a 10,000-ton cruiser, *Trieste*, was sunk in La Maddalena, Sardinia, numerous cargo boats were sunk in their attempts to bring oil and other supplies to the Axis forces in Tunis, and scores of large Savoya and Junkers transport planes were shot down or destroyed on their air-fields in Pantelaria or in Sicily. Kairouan and Sousse were taken by 12 April, and the Eighth Army continued its advance through more difficult country in the face of demollition and mines. The first junction between Anderson's First Army and the Eighth

Army occurred on 11 April some 20 m. from Fondouk, S. of Kairouan, so that the Axis had now lost the greater part of Tunis, and were being hemmed in within the N.E. corner between Enfidaville and Pont du Fahs southward and Bizerta in the N. Some 20,000 Axis prisoners had been taken by the Eighth Army since 20 Mar. Though the Ger. armour suffered severely in an engagement between Kairouan and Fondouk on 10 April the bulk of Rommel's troops escaped northward to join von Arnim. On 14 April the Eighth Army's advance guard reached Ger. prepared positions on the ridge between Enfidaville (on the coast) and the Jebel Bou Hajar, a ridge running across the coast plain from the main mountain spine. Meanwhile Fr. forces had taken part of Jebel Mansour, a position dominating the valley of the Oued el Keb and the Pont du Fahs region, while the Brit. troops of the First Army in the N. were driving von Arnim's forces back along the Beja-Mateur road, so that the Allies had regained by now most of the positions they had previously occupied in the first rush through Tunis, only to lose them to von Arnim in Feb. By 15 April the total number of prisoners had risen to 30,000.

Axis forces driven into the perimeter of Tunis and Bizerta. From the Nov. day when the Allies landed in Algeria and the First Army (then no more than a div. strong) began its advance into Tunisia, it was obvious that the keypoint where the fate of N. A. would be decided was the old Arab port of Bizerta, now a first-class Fr. naval base. Most important of all to the Axis forces were the underground arsenal near Ferryville, S. of Bizerta, and the military oil port where sev. large tankers could berth together. But Bizerta, for all its underground arsenal and reservoirs, depended for replenishment on the It. merchant navy, and the continual pounding of the Axis supply service had already taken a tremendous toll. Since she had entered the war Italy had up to this time lost in merchant shipping sunk or captured well over 4,000,000 tons. On 19 April in one of the biggest aerial engagements fought in the African campaigns, an Axis air convoy was almost entirely destroyed by Amer. Warhawks and Brit. Spitfires. No fewer than 74 Ger. aircraft, including 58 huge Ju. 52 transports out of 100 or more, were hurled to destruction on the beaches or in the sea, together with many of their escort machines. By the closing days of April the Amer., Fr., and Brit. forces were in contact with each other in an arc from the N. coast through Mejez el Bab and Goubellat to Enfidaville, and were fiercely attacking the enemy's strongholds. The Axis forces were now penned into almost the immediate perimeter of Tunis and Bizerta, from which they could not escape by land, whilst evacuation by sea or air was hazardous in the extreme. There followed a period of the most bitter and bloody fighting, often hand to hand with knives and bayonets, for every yard of the

narrowing ground, every dominating ridge or hill in a terrain rugged with complex positions of great natural strength.

Gen. Anderson's resistance in Tunis. Strategy of the final plan of attack. The whole Tunisian campaign was now, however, to undergo a rapid and most dramatic change; for before the end of the first fortnight of May the whole Axis army had been destroyed, and the First and Eighth Armies, assisted by the 2nd Corps and Fr. colonial troops, had won one of the greatest victories in the history of the Brit. Army. This swift transformation was the more remarkable in view of the situation only 6 months earlier. The Allies had invaded Tunisia the previous Nov. with only the weakest forces, the Brit. First 'Army' numbering barely 1 div. The actual forces which then invaded Tunisia were 2 infantry brigades of the 78th Div., 2 commandos, 2 battalions of parachute troops, and a composite force consisting of 1 regiment of Brit. tanks, 1 battalion of Amer. tanks, 1 motorised company of the Rifle Brigade, a battery of the Royal Horse Artillery, and some armoured cars of the Derbyshire Yeomanry, together with some divisional artillery and ancillary services. These troops succeeded in rushing forward to the occupation of the important pass of Jebel Abiod, and, had the Fr. resident-general in Tunis stood firm against the Ger. demands, the Allies might have been in Tunis by Christmas (1942). But he gave the Germans facilities for bringing in men and supplies, and very soon large Axis reinforcements were pouring into Tunisia. For a short time the Brit. forces clung to Mejez, drove the enemy back along the Mateur road, held Tebourba, and even attacked Jedeida. Eventually the Brit. forces were obliged to reorganise their line with Beja as the base and Mejez as a salient. But they succeeded in holding the enemy until they were gradually reinforced by Amer. and Fr. troops, and by the 46th (Infantry) Div. and the 6th (Armoured) Div. The Eighth Army's advance from Tripoli at first increased the First Army's burdens, for Anderson found himself confronted by formidable enemy forces which hoped to defeat him before Montgomery could arrive. Hence the Axis during Mar. (1943) launched a series of attacks on the First Army which at times Anderson had great difficulty in resisting, the enemy advancing almost to Jebel Abiod and Beja, while Mejez was left at the apex of a very dangerous salient. The first task was to oust the enemy from these positions before delivering an attack, and on 28 Mar. the First Army, strengthened by 2 more infantry divs., set to work. The Beja-Mateur road was cleared by the 4th Div. almost to Sidi Nsir, while the 78th Div. attacked the Oued Zarga Hills on 7 April and, by a series of brilliant operations, cleared them almost to Mejez. Meanwhile the 6th Armoured Div. and infantry of the 46th Div. broke through at Pichon and Fondouk, joined hands with the Eighth Army, and pursued the enemy northwards to the Enfidaville line.

Thus was the stage set for the general assault which began on 22 April with an attack by armour in the Bou Arada sector, and on the next day the attack became general—the Eighth Army attacking along the Enfidaville line, the First on the Mejez sectors, and the 2nd U.S. Corps and some Fr. units in the hills on the First Army's left flank.

Alexander opens the final offensive at Mejez and Enfidaville. In planning his culminating attack Alexander, commanding the whole 18th Army Group, realised that the enemy had grouped all his 3 armoured divs. astride the Mejez-Tunis road to meet the Brit. blow, and the one element of surprise he could hope to invoke lay in an unexpected concentration of force at the point of impact. Surmising that von Arnim, the Axis commander, would assume that the Eighth Army would be used to strike the final blow, Alexander opened the offensive with a feint attack on the Enfidaville line, discreetly withdrawing in the meantime 3 divs.—the 7th Armoured, which had fought all the way from El Alamein, the 1st Armoured, and the famous 4th Indian Div.—which were now transferred to the centre of the First Army front at Mejez. It was left to the rest of the Eighth Army to carry on the task of containing the First Panzer Army in the Zaghouan massif behind Enfidaville. Though von Arnim had strengthened his front before Mejez, his main dispositions were made to meet the thrust from Montgomery in the S., and when the blow came from the W. he was unprepared and utterly overwhelmed. Indeed, the whole battle may be said to have been won before victory was visible; for the Axis steel ring from Bizerta to Enfidaville had been worn dangerously thin by the methodical progress of the infantrymen and gunners of the Brit. First Army through the difficult and tenaciously held mts and ridges commanding the Mejez-Tunis road. The armoured stroke which was delivered on 6 May, and split the Fifth Ger. Panzer Army in two, was essentially an exploitation of mastery already achieved.

Fall of Bizerta and Tunis. A breach was opened by the Brit. First Army's infantry in a night attack, and the armoured spearhead, its path blasted in advance by brilliantly organised air co-operation under Tedder, moved forward so rapidly that von Arnim's plan of defence—to hold Bizerta as an isolated enclave, and to wheel most of his Fifth and First Armies back, pivoting on Zaghouan, to the Cape Bon Peninsula for a final stand—was completely shattered. Half the Ger. Fifth Army was pushed N.-westwards from Tunis into a pocket the W. side of which was closed by the vigorous advance of the 2nd U.S. Corps—which had some time previously been transferred from Gafsa to the N. to co-operate with a Fr. force—from Mateur (which important rail junction was seized by the Amer. corps on 3 May, together with hundreds of Ger. prisoners) to Bizerta and the mouth of the Medjerda R. In this pocket nearly 50,000 Ger. troops

and 6 generals, including the general commanding the Fifth Army, capitulated *en masse*. Both Bizerta and Tunis fell later in the day of 7 May, the Americans entering Bizerta and the British Tunis.

Von Arnim's withdrawal to Cape Bon peninsula foiled. Von Arnim captured, together with a quarter of a million prisoners. It was the next stage, however, which justified still more strikingly the tactics of Alexander in transferring part of the Eighth Army to increase the weight and impetus of the First Army's break-through. If von Arnim's planned withdrawal to Cape Bon was to be frustrated and his forces, instead of effectuating a 'Dunkirk evacuation,' were to be decisively disintegrated, it was essential, on reaching Tunis, to have sufficient strength to fan out in 2 directions—one part of the spearhead to complete the encirclement of the enemy at the Medjerda R., the other to pursue the Fifth Army retreating eastwards from the cap. and, by forcing a way down the Hammam Liff-Hammamet valley, to cut off from Cape Bon the strong Ger. First Army which was held between Zaghouan and Enfidaville by the remainder of the Brit. Eighth Army and by the French who were now in possession of Pont du Fahs. This object was achieved. The Brit. armoured forces reached Hammamet and thereby disorganised all Axis resistance on their way. Cape Bon, with a large additional haul of prisoners, was quickly seized. The Ger. First Army was surrounded, and on 12 May the last resistance collapsed. Von Arnim and his staff were taken prisoner, but Rommel had escaped to Germany. The R.A.F. and navy prevented any Ger. repetition of a 'Dunkirk.' In all over 50,000 of the enemy were killed and nearly a quarter of a million prisoners (more than half being Germans) were taken. Only 638 escaped—mainly by air. The Brit. losses (killed, missing, and wounded) since the general offensive began were 35,000 in all (Eighth Army, 11,500; First Army, 23,500). Thus was won a mainly Brit. victory which afforded a truly classic example of military art, crowning the double campaign which had been begun 6 months previously by forces nearly 3000 m. apart. The Ger. defeat was not inglorious. With the greatest skill the Germans, defeated at Alameln, and threatened in the rear, having lost control of the air early in the campaign, gathered their forces to hold a bridgehead, while Rommel undertook a retreat which was masterly in its timing of moves, economy of forces, and organisation of transport.

See H. Rowau-Robinson, *Wavell in the Middle East*, 1942; H.M. Stationery Office, *The Battle of Egypt*, 1943; A. Moorehead, *The End in Africa*, 1943; P. Guedalla, *Middle East, 1940-42*, 1944; H.M. Stationery Office, *The Eighth Army*, 1944; Viscount Montgomery, *El Alameln to the River Sangro*, 1948; D. Young, *Rommel*, 1950; *The Rommel Papers*, ed. by B. H. Liddell Hart, 1953; F. W. von Mellenthin, *Panzer Battles, 1939-1945*, 1955; H.M.S.O., *The Mediterranean and the Middle East*, vol. II, 1956.

Africa, South-West, is bounded N. by Angola, W. by the Atlantic Ocean, S. and E. by the Union of S. A. and Bechuanaland Protectorate. It lies between S. lat. 17° 25' and the Orange R., with a narrow strip between 17° 30' and 18° 20' S. lat., extending from 21° to 25° E. long., known as the Caprivi Zipfel, and giving access to the Zambesi. The boundaries are the Okavango and Kunene R.s in the N. and the Orange R. in the S. The total area is about 317,700 sq. m. (excluding Caprivi Zipfel, which is under the Bechuanaland Protectorate and Walvis Bay, 375 sq. m.). The estimated pop. (1951) was Europeans, 49,641, and natives, 381,266, of whom over 165,000 are estimated to be in Ovamboland. The prin. native race is the Ovambo (a Bantu race), and others are the Hereros and Hottentots. The Hereros are a pastoral race, but their tribal organisation was ruthlessly shattered by the Germans in the Herero war. Under the S. African mandatory rule reserves have been assigned for their occupation.

Physical features. The coastal areas of the W. are barren, especially between the Orange and Ugab R.s and towards the E. boundary, where a part of the Great Kalahari Desert is included in SW. A. There are good grazing dists. in the E., but the country as a whole is poorly watered, only the Orange and Kunene R.s having a perennial flow. For the rest, SW. A. depends on wells and the subterranean streams of the 'karst' region.

Under the SW. A. Affairs Amendment Act of 1949, the ter. elects 6 representatives to the Union House of Assembly (parliament). The ter. is also represented in the Union Senate by 4 senators, 2 of whom are nominated by the governor-general. The other 2 are elected, one for his knowledge of the ter.'s native races. Registered voters also elect 18 members to the SW. A. Legislative Assembly.

Commerce, communications, etc. Stock-raising is the chief industry, but there is some agric. activity in the less barren regions of the N. Diamonds form the staple product, and the stones, if small, are of good quality. Diamonds exported in 1954 amounted to 550,987 carats valued at £12,068,070. Minerals exported (1954) included lead, £6,736,875. Other minerals exported were copper, tin, vanadium, zinc, and manganese. Karakul skins exported in 1954 were valued at £3,866,529 and live animals at £2,779,685. There is an important fishing industry, and preserved fish exported (1954) was valued at £2,570,788. Excellent marble is found in quantity but is not worked to any extent. Meteorites are widespread. Imports (1954) totalled £22,660,018, and exports £36,848,432. The total length of the railway from the Cape within SW. A. is about 1300 m., much of the extension having been carried out during the campaign of 1915. There is also a line of 100 m. linking up the diamond fields near Lüderitz. There are over 21,000 m. of road in the ter. and railway motor services operate over 3237 m. The main towns are Keetmanshoop, Mariental, Windhoek

(cap., European pop. 13,000), Swakopmund, Walvis Bay, and Grootfontein.

First World War campaign. At the beginning of the First World War campaign the Germans seized Walvis Bay. Their forces, late in the campaign, were estimated at 5000 regulars and reservists, a high proportion of the white pop. of 13,000 being composed of well-trained reservists. Their total force was not large enough for operations in a colony of 320,000 sq. m. with a native pop. of 90,000, many of whom were still smarting under the memory of the Herero war. The Union forces under Botha and Smuts, in spite of rebellion and the mutiny of the troops, compelled the Germans to surrender by July 1915, thus bringing to an end one of the most brilliant campaigns of the 1914-18 war. Under the treaty of Versailles the colony was ceded by Germany—who had annexed the country in 1881—to the Union of S. A., which administers the ter. under mandate as an integral part of the Union.

In the course of the Nazi regime in Germany efforts were soon made to induce the Ger. settlers in SW. A. to agitate for the retrocession of the country to Germany. By 1938-9 the whole atmosphere of the country was clouded with political anxiety owing to the obvious efforts of the Nazi Gov. to make the most of every Ger. community in every part of the world as a cell or nucleus for promoting Ger. influence. In SW. A. there were in 1938-9 approximately 20,000 Union nationals as against 10,000 Germans, but they were not politically organised. Hence, to counteract the pressure exerted by the Nazis on the loyalist elements, they formed the SW. African League, the objects of which were to knit the Union elements more strongly together and generally to strengthen resistance to Nazi influences by enlightening them on Union and Imperial policy. The retention of SW. A. must remain a cardinal feature in the Union's external policy; for the Union can never permit the intrusion of a powerful and aggressive neighbour, nor does it desire the forces of anti-Semitism in the Union to be strengthened.

African Violet, *Usambara violet*, popular house plant. See SAINTPAULIA.

Afridis, a numerous tribe belonging to the Pathan or Pukhtun div. of clans and occupying the mountainous region on the NW. frontier of Pakistan. They are estimated to number some 250,000.

Afrikaans, modern language which has developed mainly from 17th-cent. Dutch introduced into S. Africa by the first settlers (see AFRIKANER). A. is one of the 2 official languages in S. Africa, English being the other. Applicants for public appointments are usually required to be bilingual. According to the 1946 census 57.3 per cent of the European pop. claimed A. as their mother tongue. In the rural areas, 82.4 per cent spoke A. in their homes; in the urb. areas the proportions speaking A. and English were equal. There is a growing literature in A. which is officially encouraged.

Afrikaner, person of pure European

descent, b. in S. Africa or of A. parents; generally, but by no means exclusively, applied to Europeans of non-Brit. descent. Usually the mother tongue is Afrikaans (q.v.). The main support of the National party is from the A. section of the community. It is a fallacy that A.s are anti-British *per se*, but they are essentially pro-S. Africans with republicanism an avowed political policy. The A.-Bond or Bond party was founded (1879) in Cape Colony by J. H. Hofmeyr, du Toit, and others, and had as its object the furtherance of A. or Dutch influence in S. Africa. From its object and personnel it naturally followed that it warmly sympathised with the Boer reps. in their war with England (1899-1902). After that war it changed its name to the S. African party. In the first parliament of the S. African Union this party, under the name of Het Volk (The People), secured a majority, and its leader, Gen. Botha, became Prime Minister. The chief A. leader against Gens. Botha and Smuts was Hertzog (q.v.), whose attitude in the First World War was equivocal. The rebellion which took place during the First World War was suppressed. For later developments see SOUTH AFRICA, *History*. See W. M. Macmillan, *Bantu, Boer and Briton*, 1929, and S. Patterson, *The Last Trek*, 1957.

Afrit, see IFRIT.

Afsluitdijk, dike in the Netherlands, extending from Den Oever in the prov. of N. Holland to Friesland, about 2 m. SSW. of Zürich. The dike is 19 m. long and separates the N. Sea from the IJsselmeer (q.v.). It was completed in 1932, and has an excellent roadway on its surface. There are locks at both ends of the dike.

After-image, in psychology, a sensory experience which persists after the ending of the stimulus. Immediately after looking at a red light which is switched off a vivid red A. may be seen for a short time. This is a positive A. A more common experience is that of the negative A. in which the form and size of the object which has been looked at with steady gaze are reproduced, but in the complementary colour. Thus a red object gives a blue-green A., and vice versa. Similar A.s are found in some other senses, but less strikingly than in sight. Positive A.s are the result of a burst of nervous impulses from a sense organ shortly after the stopping of the stimulus; negative A.s are attributed to the relative exhaustion of those sensory end-organs that have been made active during the previous stimulation.

Afterbirth, see PLACENTA.

Afterglow, phenomenon of a broad arch of light, either whitish or rosy, which sometimes appears above the highest clouds after sunset, and is due to fine particles of dust which affect the white light. The shorter waves are absorbed by the particles, the longer ones being more or less reflected. This phenomenon was widely observed in the red sunsets occasioned by the eruption in Krakatoa in 1883.

Aftermath refers to the growth of grass which follows cutting for hay or silage in spring. It may be left for grazing during the winter and is then known as fog or foggage. This is usually poor feed but will maintain cattle and sheep in store condition. The word is now used metaphorically for any sequence or consequent event.

Afyonkarahisar, or **Afium Kara Hisar**, tn in E. Turkey. It contains beautiful churches and mosques. Its chief trade is in opium, but it manufs. firearms, woollen and cotton goods, felts, and tapestry. Pop. 20,000. In the Gracco-Turkish war, 1921-2, the Greeks, heavily defeated in Sept. 1921, retired on Eski-shehr and repulsed Turkish attacks at A. in Oct.

Afzelius, Adam (1750-1837), Swedish botanist, studied under Linnæus, became demonstrator in botany at Uppsala 1785, and prof. of medicine 1812. He explored Guinea 1792, and wrote sev. works on natural hist.

Afzelius, Arvid August (1785-1871), Swedish writer and folklorist. He was the author of *Den Sista Falkengen*, a drama, and a hist. of Sweden up to the death of Charles XII. He ed. popular Swedish songs, and trans. into modern Swedish the *Elder Edda* and the *Hervara Saga*.

Aga, word signifying lord, of Turkic origin. The Turks used it for chiefs of the janissaries. It is in general use in Persian as the equivalent of 'sir'.

Aga Khan III, Aga Sultan Sir Mahomed Shah (1877-1957), Persian by descent and Indian by adoption, b. Karachi. The secular title A. K., without territory, was first bestowed by Queen Victoria on his grandfather, Hasan Ali Shah (1800-81), in recognition of his work in India and his relations with the Brit. Gov. A. K. III succeeded to the title at the age of 8, and became also the 49th head of the Ismaili Mohammedans, with a following of over 10 million throughout Africa and Asia. He was regarded in India as an elder statesman, and frequently acted as mediator between the Brit. Gov. and Indian nationalists before independence was achieved, as well as helping Brit. relations with the E. in general by his influence in the Islamic world. His personal association with the Brit. royal family began with a visit to Windsor Castle at the invitation of Queen Victoria, and his friendships with Edward VII and George VI were particularly memorable. He was a great authority on racehorse breeding, and was the owner of 5 Derby winners. His wealth was fabulous, but he was always generous in distributing money among his followers and elsewhere. He was succeeded in July 1957 by his 19-year-old grandson, Karim.

Agade, see **AKKAD**.

Agades, tn in the Niger colony, Fr. W. Africa, and centre of nearly all the most important caravan routes. It is the cap. of Ashen, S. of the Sahara, and is situated on the edge of a plateau. There is a Fr. garrison stationed at A.

Agadir, Moroccan tn and fishing centre.

It was once an important seaport owing to its situation at the mouth of the Sus, being the most southerly maritime tn in Morocco. The revolution of 1773, and the subsequent rise of Mogador, lessened its importance. In Aug. 1911 the A. incident, as it was known, nearly precipitated a European war on a large scale. The incident arose as follows: The treaty of Algeiras (q.v.), concluded in 1906, to which all the great powers, including Germany, were signatories, and in which France and Spain were entrusted with the task of preserving order in disturbed Morocco, was supposed to have settled the Moroccan question, but the sudden appearance off A. of the Ger. gunboat, *Panther* (replaced later by the cruiser *Berlin*), and the demand of the Ger. Kaiser for 'a place in the sun,' precipitated a feeling of exasperation in France, which, had it eventuated in war, would inevitably have embroiled England. The prolonged negotiations or 'conversations' between the 2 countries resulted in Germany agreeing to forgo her claims in respect of Morocco, in exchange for which certain portions of Fr. Congo were ceded to her. Pop. 5626.

Agallochum, see **ALOE WOOD**.
Agalmatolite (Gk *agalma*, image; *lithos*, stone), or **Pagodite**, soft mineral, hydrous silicate of aluminium, grey to pale green and red, which is used in China in the sculpture of small statues and other objects.

Agama, genus of lizards of the family Agamidae (q.v.), native to Africa and India. It is of sombre colour, has a triangular head, a conical tail covered with scales, is capable of inflating the skin, and inhabits ruins and rocky places.

Agamedes, legendary son of Erginus, King of Orchomenus, with his brother Trophonius was regarded as a supernaturally gifted architect. They built a treasure house for the King of Myria in Boeotia and systematically robbed it by means of a loosened brick. A. being caught, his brother cut off his head, to avoid identification of the body, and fled, but was swallowed up by an earthquake. According to Cicero, the two brothers built a temple to Apollo at Delphi, and prayed the god to grant them whatever reward was best for man. This was promised them on a certain day, and on that day they died.

Agamemnon, according to Homer son of Atreus, King of Mycenae, and grandson of Pelops. After the murder of Atreus, A. and his brother Menelaus went to Sparta, where A. married Clytemnestra, sister of Helen. He became King of Mycenae, and Commander-in-Chief of the Greeks against Troy. At Aulis, where the expedition assembled, A. killed the favourite stag of Artemis, for which a pestilence and calm delayed his start. To appease the goddess A. consented to sacrifice his daughter Iphigenia (q.v.). The army then sailed to Troy, and the quarrel between A. and Achilles is one of the most memorable events of the *Iliad*. When Troy was taken A. received Cassandra, daughter of Priam, as his

prize; and on his return home he was murdered by Aegisthus and Clytaemnestra, his wife. His murder was avenged by his son Orestes, who killed Aegisthus and Clytaemnestra. A. may have been an historical character.

Agami, the native name for the trumpeter of tropical S. America, to which Latham has given the name of *Psophia crepitans*. It belongs to the Gruliformes, and is closely allied to the cranes. It is a beautiful, many-coloured bird, gregarious, easily tamed; it chooses mts and upland forests for its home, and feeds on insects and fruit. The eggs, 10 to 16, are laid in a scratched-out hole, the young are covered with down, and the mature bird is about the size of a pheasant. Its name is obtained from its trumpet-like cry.

Agamidæ (Gk *a*, without; *gamos*, marriage; *eidos*, form), family of lizards, which has the agama (q.v.) for its type. It includes the *Chlamydosaurus* of Australia, which runs on its hind legs and has a curious frill on each side of its neck; the *Draco*, or flying dragon, common to Malaya; the *Moloch*, an Australian lizard, whose body is covered with large spikes; and the *Calotes* of India, which changes its colour.

Agana, or San Ignacio de Agana, fortified cap. of Guam, Ladrone Is. Its port is the U.S. base at Apra. Pop. 9000.

Aganippe, a celebrated fountain in Boeotia. It is situated at the foot of Mt Helicon, and was sacred to the muses, who were sometimes on that account referred to by anct writers as Aganippides.

Agapanthus (Gk *agapê*, love; *anthos*, flower), genus of African plants belonging to the Liliaceae. *A. orientalis* and *A. campanulatus* are grown in gardens.

Agape, Gk for love, used also in N.T. and primitive Church to signify love feasts connected with the Lord's Supper, at which the rich supplied food which the poor shared. For a time the A. and the Lord's Supper were celebrated consecutively during the evening, but human frailty led to scandals which St Paul deals with in 1 Cor. xi. Whether he himself separated the A. from the Eucharist at Corinth, when he arrived there later, is uncertain. From the 3rd cent. the banquets deteriorated in character, and the whole ceremony was banned by the Church. Cf. Jude xii.

Agapemonites, name given to persons who were members of a community which was founded by H. J. Prince, a former clergyman of the Church of England, and his rector, Starkey, at Charlifh near Bridgwater (Somerset) in 1846. The community lived in a single building, sharing their possessions under the leadership of Prince, whom they termed 'the Lord.' Agapemone, the name of the community, means 'the abode of love.' There were similar societies in England before this one, e.g. the Family of Love (q.v.) in the 16th cent., and also a later one about 1896 known as 'The Children of the Resurrection,' who built a place at Clapton which they called the Ark of the Covenant. It is not fully estab. whether Prince really permitted or proclaimed free

love at the Agapemone, but that there were serious breaches of decorum and manners there is evidenced by the proceedings taken in the Chancery Court in 1860.

Agapetae (from Gk for 'beloved'), virgins of the early Church, who were associated with bishops, priests, and deacons, to whom they were bound by ties of spiritual love, and to whose material needs they ministered. The institution was later abused; having been denounced by sev. councils and Fathers from the 4th cent. onwards, it was finally suppressed by the Lateran Council of 1139.

Agapetus, name of two popes. *Agapetus I.*, St (535-6), assisted in the estab. of a library of eccles. books at Rome and deposed Anthimus, the patriarch of Constantinople. He d. at Constantinople, where he had been sent by Theodahad, King of the Goths. The Rom. Catholic Church celebrates his festival on 20 Sept., the Greeks on 22 April.

Agapetus II (946-55), Roman by birth, appealed to Otto the Great of Germany against Berenger II, King of Italy, and attempted to free Rome and the papacy from degradation.

Agar-agar, otherwise known as Bengal or Japan isinglass. It is obtained from certain algae (*Gigartina speciosa*, *Gracilaria lichenoides*). It is similar to gelatine, though it requires more heat to liquefy it after it has once assumed jelly form. Its prin. use is as an artificial culture medium for bacteria.

Agardh, Karl Adolf (1785-1859), Swedish botanist, b. in 1785 at Båstad. He became prof. of botany there in 1812. Later he entered the Church, becoming Bishop of Karlstad in 1834. He wrote voluminously upon the algae, and on these great works our present knowledge of that botanical div. is based. His son, Jacob Georg, succeeded him in the professorial chair (1854-79).

Agaricus (synonym *Psalliota*), genus of fungi, family Agaricaceae of the Basidiomycetes, mostly known as mushrooms. *A. campestris*, common or field mushroom, *A. hortensis*, cultivated mushroom, *A. arvensis*, horse mushroom, *A. subvicolæ*, wood mushroom, *A. sylvatica*, brown wood mushroom, *A. pratensis*, fairy ring mushroom, and *A. haemorrhoidaria*, bleeding mushroom, are edible; while *A. xanthoderma*, yellow-staining mushroom, and *A. flavescens*, saffron-yellow-staining mushroom, are often poisonous to some people.

Agasias, Gk sculptor of Ephesus of the 1st cent. BC. The statue called 'The Borghese Gladiator,' now in the Louvre, was his work.

Agassiz, Jean Louis Rodolphe (1807-1873), celebrated naturalist, b. at Moutier in Switzerland. He was educ. first at home, and afterwards at the academy of Lausanne. He adopted medicine as a profession, studying at Zürich, Heidelberg, and Munich. In 1829 he took the degree of doctor of philosophy, and in the following year that of doctor of medicine. From that time he gave his energies to

the study of ichthyology, and became the most eminent authority on the subject. He was asked, previous to graduating, to complete a hist. of the freshwater fish of Brazil, which had been undertaken by Spix, who d. while on the work. His brilliant success earned recognition from Cuvier, who became his friend. In 1831 he accepted a professorship at Neuchâtel. He gained the London Geological Society's Wollaston Prize by the pub. of his *Researches on the Fossil Fishes* (5 vols. of this work appeared between 1833 and 1844). In 1840 he began a study of the glaciers of the Alps, expressing his views in the *Études sur les glaciers* and his *Système glaciaire*. Previously (1839) he had written a *History of the Freshwater Fishes of Central Europe*. In 1846 he went to America and delivered a course of lectures on zoology at the Lowell Institute, expounding his theories on the 'Plan of the Creation.' These lectures were most successful, and in 1848 he was appointed to the chair of zoology and geology at Harvard, and made expeditions of a scientific nature to Lake Superior. Distinction after distinction followed, and he had to decline invitations from Paris and Zürich to accept professorships. Incessant work had meanwhile undermined his health, and a holiday, afterwards an organised scientific expedition to Brazil, was arranged. He d. at Cambridge, Massachusetts, while engaged on the compilation of *Contributions to the Natural History of the United States*.

His son Alexander (1835-1910) was b. at Neuchâtel, and graduated at Harvard in 1855, studying chem. and engineering. In 1859 he became an assistant in the U.S. Coast Survey, taking a great interest in mining. (Incidentally he amassed a fortune from some copper shares which he held.) He made a collection of Peruvian antiquities for the Harvard museum, and became its curator. Among his other interests riv. dredging and deep-sea research occupied a large place. His works include a *Review of the Echini*, 1872-4, *Seaside Studies in Natural History*, 1865, and *Marine Animals of Massachusetts Bay*, 1871.

Agastya, Brahmin saint, supposed to have written sev. Vedic hymns and to have been a pioneer teacher and writer of Tamil literature. He is still said to dwell as a *yogi* on the peak of Agastyamalai, a hill in Travancore. The construction of the pond called Vishnu Puskarni Tirth in Bombay is accredited to him.

Agate, James Evershed (1877-1947), journalist, b. Manchester. He was educ. at Giggleswick and also studied music. Dramatic critic successively of the *Manchester Guardian*, the *Saturday Review*, and finally the *Sunday Times*, he also wrote novels and essays. His diary *Ego*, which ran to 9 vols., one appearing after his death, contains miscellaneous reflections on contemporary men and affairs.

Agate, one of the varieties of chalcedony, a form of silica SiO_2 . Most A.s exist in rounded nodules or in veins in volcanic rocks. They are probably

formed by deposits of water containing silica in lava when viscous. When depositions have not occurred sufficiently to fill the hollow in the lava, the A. is hollow. The stones are easy to polish and a considerable industry in A.-working has been carried on in Germany around Oberstein. At the present day, however, the A.s themselves are imported from Brazil. Naturally unattractive A.s are artificially stained, an art which is of ancient origin. The colorations are many, the chief being dark brown, red, blue, green, and yellow, while the appearance of others gives rise to the names star A.s, moss A.s, and clouded A.s. Many are found in Scotland under the name of 'Scotch pebbles.' Besides ornamentation, A.s are used in the making of knife-edge fulcrums for delicate balances, and for the manuf. of small pestles and mortars. Some of the finest A.s come from Ontario, a dist. on the edge of Lake Ontario being called A. Bay. India, New S. Wales, Queensland, and Africa also produce A.s.

Agatha, St. the patron saint of Catania, Sicily. According to a legend she was a Sicilian noblewoman of great beauty, who refused the love of the Rom. prefect. She was sentenced to be burnt alive, but at the application of fire to the stake an earthquake occurred. She d. in prison, and her name is found in the martyrologies of both the E. and the W. Church, and in the Canon of the Rom. Mass. Her feast is on 5 Feb.

Agatharchides, or **Agatharchus** (2nd cent. BC), Gk historian and geographer, b. at Cnidus. Extracts of his work on *Asia*, *Europe*, and the *Red Sea* have been preserved by Photius, who commends his style, modelled on that of Thucydides.

Agathareus, Athenian painter of the 5th cent. BC. Vitruvius says he was the first painter to execute scene-painting, but his work in this direction would be the wooden front of a stage building which could be used on all occasions. Alcibiades, it is said, forcibly compelled him to paint the interior of his house, which testifies to the popularity of the decorative painting of rooms.

Agathias (AD 536-81), Byzantine historian and poet, b. at Myrina in Asia Minor. He studied law, and practised in the courts of Constantinople. Literature, however, became his favourite pursuit. He wrote sev. short love-poems called *Daphniaca*, and compiled an *Anthology of Epigrams*. He also wrote a hist. of his own times in 5 vols., which is the chief authority on the period 522-58. This has been ed. by L. Dindorf in vol. II of *Historici Graeci Minores*, 1871. The poetry is ed. with trans. in vol. III of W. R. Paton's *Greek Anthology* (Loeb Library), 1917.

Agathis, Kauri Pines, family Pinaceae, a genus of conifers with broad, lance-shaped, leathery leaves, native to the E. Indies and Australia. *A. alba*, Amboya Pitch Pine, *A. australis*, Kauri or Cowrie Pine, and *A. resinosa*, Fijian Kauri Pine, are sources of resin for varnish.

Agathocles (361-289 BC), tyrant of Syracuse, was b. at Thermae in Sicily.

His father was a potter, and A. was put to the same trade, afterwards serving in the army. In 333 he married the widow of his patron, Damas, a distinguished and wealthy citizen. Banished from Syracuse for endeavouring to overthrow the oligarchy, he returned in 317 at the head of an army, and within a few years subjugated all Sicilian territory which was not in Carthaginian hands. In 311 A. was defeated by Hamilcar and besieged in Syracuse. But he managed to escape, and carried the war into Africa. After a number of successful campaigns he returned in 307 to Sicily, where his power was threatened by the revolt of sev. cities. His last years were embittered by domestic feuds, in the course of which his son was murdered by his grandson Agatharcus, at whose instigation, some authors tell us, he was himself poisoned. It is more probable, however, that he d. a natural death.

Agathodaemon, map designer of Alexandria who lived probably about the 2nd cent. AD. Ptolemy's *Geography* contains in the MS. 27 maps said to have been executed by A.

Agathodaemon, Gk spirit of good fortune for cornfields and vineyards. Wine was drunk in his honour after every meal.

Agathon (c. 447-400 BC), Athenian tragic poet, immortalised in Plato's *Symposium*, which is an account of a banquet given by A. to celebrate his first victory in 416 BC. Aristotle remarks on the originality of his plots, while Aristophanes considered his choruses 'voluptuous' and parodied them accordingly. See A. Nauck, *Tragicorum Graecorum Fragmenta*, 1926.

Agave, family Amaryllidaceae, genus of large rosette plants, sometimes called Century Plants, of which *A. americana*, Mexico, is well known, with long leathery leaves, flowering stems to 25 ft high, and roots with detergent properties, often used for washing. *A. sisalana* is the source of sisal, a strong fibre, and of the Mexican drink, pulque, made from the fermenting sap.

Agbatana, see ECBATANA.

Agde, Fr. tn in the dept of Hérault, on the Hérault, 4 m. from the Mediterranean. It has a considerable trade in wines. Pop. 7600.

Age, in common law, at which a marriage is valid is 16 years. The A. giving the privileges of an adult, and at which a person ceases to be an 'infant' in the eyes of the law, is 21; the computation of these years is curious, for the day of birth is included and fractions of a day are unconsidered, so that a person may attain his majority nearly 2 days before his twenty-first birthday. The canonical A. in the Rom. Catholic Church is 21 for a sub-deacon, 22 for a deacon, 24 for a priest, 30 for a bishop. In the Anglican Church a man may become a deacon at 23 and a priest at 24.

Age, in physiology, is divided into 5 periods of development and decay in humankind—infancy, which extends to the end of the seventh year, and childhood

to the fourteenth; adolescence in males and females varies, but averages to about the twenty-first year, adult life to about 50 years, and after that period comes old A. The limits of human existence are unknown, but Thomas Parr ('Old Parr'), the oldest known Englishman, whose dates are not properly authenticated, is said to have d. at the A. of 153. Cases of persons attaining a century of existence are of common occurrence.

'Age.' The, Melbourne, influential independent morning newspaper, founded 1854. Extensive coverage is given to international and Australian affairs, with special attention to political and financial news. It has estab. a reputation for its authoritative leading articles and its literary pages.

Age of Animals is difficult of determination, as it can be studied only in creatures in captivity, the unnatural conditions tending to shorten life considerably. Among the low forms of life a sea anemone (*Actinia mesembryanthemum*) lived in captivity from 1828 to 1887 in the botanical gardens of Edinburgh, while a clam, *Tridacna gigas*, lived for a century; oysters and edible snails exist for about 4 years, and crabs can attain 50 years. Insects frequently die after a few hours or months, though the larva may have endured for sev. years. Lord Avebury kept an ant once for 15 years; among bees the workers die after 6 weeks, while the queen may reign for 5 seasons. Fish are usually devoured by larger species, but the more ferocious sometimes survive for an enormous period, a pike having been reported to live for 267 and a carp for 200 years. But these figures are not reliable. Tortoises have been known to live for more than 100 years, and most likely can reach 2 centuries; frogs die sooner than toads, which may live for 36 years.

Small birds, such as canaries, average about 15 years in captivity, though parrots and swans may live for 80 years. Prolific animals are usually short-lived, swine seldom passing 20 years; large rodents, such as hares and rabbits, 10 years; small rodents, such as rats and mice, 5 years. Among domestic animals, cats may live 12 to 25, dogs 16 to 18, horses and asses 15 to 30, cattle 25 to 30, sheep and goats 12 to 14, deer 10 to 15 years. Wild animals, such as the elephant and the hippopotamus, cannot be fairly judged in captivity, but under such a condition they have attained 35 years, and one elephant lived for 69 years. Monkeys soon die when in this cold climate, and lions do not here reach their estimated 30 years.

The determination of the A. of domestic animals is usually accomplished by noting their dentition. In sheep and goats the incisors appear during the first month, the first permanent molars by the sixth month, the milk-teeth fall at the A. of 2 years, the true molars are complete in the fifth year. The milk-teeth of a dog come out between the third and fourth month, and the animal ceases to be a puppy at the ninth month. In horses the

front incisors appear at the end of 8 days, the middle at the end of 5 weeks, the back between the sixth and eighth month. They show signs of wear in order of appearance; at 2 to 2½ the front teeth fall and are replaced; at 3½ to 4 the middle teeth fall, and at 4½ to 5 the back incisors. At 6, 7, and 8 respectively the front, middle, and back teeth decay. In cattle both dentition and the rings on the horns indicate A., the first ring appearing at the A. of 3. The A. of a stag can be ascertained approximately by the branches of the antlers up to the seventh year, but the oldest stag never has more than 10 or 12 branches. See G. L. L. Buffon, *Histoire naturelle*, 1749, and Sir E. Ray Lankester, *Comparative Longevity in Man and the Lower Animals*, 1870.

Age of Discretion in Law is the time at which an infant is supposed to have attained sufficient understanding to judge the morality of his actions. A child under the A. of 8 is presumed to be incapable of criminal responsibility; a child of 8 years of A. but less than 14 is *prima facie* incapable of criminal liability, but this can be rebutted by evidence that such a child knew that he was doing wrong. It is a misdemeanour for one over 16 years of A. to ill treat a child under 16 who is in his charge. A person under the A. of 21 cannot be sued on a contract except for necessities (e.g. food, clothing, apprenticeship). Such a person if made party to a civil action must be represented by someone over 21.

Age of the Earth. The most recent estimate puts the A. of the E. at 4500 million years. Rocks have been forming on or within the crust of the earth from early times to the present, and various techniques have been employed to establish their A. The absolute A. of a rock, or the time that has elapsed since its formation, may be found if it contains any mineral in which a radioactive element is present, which can be extracted together with the product of its radioactive decay. The ratio which the radioactive element bears to its breakdown product will be a function of the time which has elapsed since breakdown began and hence of the A. of the rock. Uranium, thorium, and the radioactive isotope of potash (K 40) are elements which have been used to provide data of this nature. The relative A. of rocks can be found by observation of their relations in the field, which will often show the sequence in which they formed. This was appreciated first by Wm Smith (q.v.) in the 18th cent. when he realised that the youngest rocks in a succession of beds must be those at the top of the sequence. The relative A. of fossiliferous rocks may be estab. by comparison of their fossil faunas. However, many rocks are unfossiliferous, particularly those deposited on land, and usable fossils are not known from rocks formed in the first 4000 million years of the earth's hist. in Pre-Cambrian time. Our knowledge of Pre-Cambrian chronology is thus largely dependent on radioactive determinations.

Age of Trees may be computed, in temperate zones, by counting the annular

or growth rings at the base of the stem. These rings are formed by the difference in colour and cell structure between the spring and summer wood. In some woods the difference is marked; in others it is not apparent. Tropical woods do not often form ann. rings, as the alternation of the seasons is not sharply marked as in temperate lands. Many trees attain a great A. The Big Tree of Tule in Mexico, a species of *Taxodium*, is reputed to be 6000 years old, while the *Sequoias* of California are thought to exceed 3000 years in some cases. See FORESTRY and TREE.

Agen, Fr. tn, cap. of the dept of Lot-et-Garonne, on the Garonne. It is the seat of a bishopric. It has chemical manufs., and is known for its preserved fruit. Scaliger and Jasmin (qq.v.) were b. here. Pop. 33,400.

Agent. An A. is one who is authorised by another to do acts for him and in his name, the person who authorises him being called the principal or constituent. There are many kinds of A.s, public and private, and they are known by many names, such as broker, bailiff, factor, ambas., consul, etc., and the title of A.-general is borne by many Brit. colonial officials who represent the self-governing colonies in the home country. For transactions other than those of minor importance it is usual for an A. to receive his appointment in writing, and an A. by deed cannot bind his principal otherwise than by deed. The granting of such instructions is called the granting of 'power of attorney.' An A. acting under a commission *del credere*, i.e. undertaking to be surety to his principal for the solvency of his principal's customers, is, in these customers' default, held accountable for debt, but in all other cases he is not liable. As a general rule the act of an A. is considered as an act of the principal, and the principal is in general liable for damage occasioned to third persons by the negligence or unskillfulness of his A. See COMMISSION.

Agent Provocateur, one employed, during political or social conflicts, in the guise of an adherent, to stir up compromising action. The method was in vogue in Tsarist Russia when the Gov. used A.s P.s to foment risings to use as the excuse for suppressing revolutionary movements. They have also been used in other countries in the struggle between govts. and revolutionary movements. Also, in labour disputes, their purpose is to try to induce strikers to commit unlawful acts, so provoking armed clashes. In international politics A.s P.s have been used to provide pretexts for interventions.

Ageratum, genus of ann. or biennial plants, family Compositae, chiefly Amer. *A. houstonianum* and varieties are popular garden half-hardy anns.

Ages of the World, periods into which the hist. of the world is divided, each period being marked by some special feature. The idea originated among the Greeks, and in the works of Hesiod 5 periods are mentioned: 1. The Golden Age, when Saturn reigned, was a time of perfect

innocence and happiness, without work. 2. The Silver Age, when Jupiter reigned, was a time of godlessness, when troubles and labour commenced. 3. The Brazen Age, when Neptune reigned, in which war, violence, and lawlessness prevailed. 4. The Heroic Age, which was an improvement on the Silver and Brazen A. 5. The Iron Age, when Pluto reigned and Hesiod himself lived, was the most miserable and wicked of all, for virtue had gone out of the world. Ovid, in his *Metamorphoses*, mentions the Golden, Silver, Brazen, and Iron A. European hist. has also been divided into periods: The Middle A. (q.v.), or the period after the fall of Rome until the 15th and 16th cents., which were marked by the Reformation and the discovery of America. The Dark A. (q.v.), a period marked by the decline of classical learning and civilisation, extended from the invasions of the barbarians into Europe until the time of the Renaissance. It is also common to speak of such periods as the Homeric Age, the Augustan Age, and the Elizabethan Age; and also the Stone Age and the Bronze Age.

Agglomerate consists of a large mass of blocks or bombs of all sizes and shapes. It is of volcanic origin, and is frequently found in the necks of the craters of ancient volcanoes. These blocks sometimes consist of igneous rocks, sometimes of sedimentary rocks, and sometimes of both.

Agglutinative Languages are those languages which combine into a single word various linguistic elements, each of which has a distinct fixed connotation and a separate existence: e.g. in Basque the word *ponetekitlakoakin* means 'with him who has a cap (*ponet*)'. The prin. A. L. are the Mongolian, Turkish, Finnish, Hungarian, N. Amer., the Dravidian (Tamil and Telegu, etc.) In S. India, and some other languages.

Aggression, term first used officially in the treaty of Versailles, 1919, which speaks of 'the aggression of Germany.' It is incorporated in the Covenant of the now defunct League of Nations, member states undertaking 'to respect and preserve against external aggression the territorial integrity and existing political independence of all members' (see COVENANT OF THE LEAGUE OF NATIONS). The Mutual Assistance Pact, 1923, and the Geneva Protocol, 1924 (q.v.), were vain attempts to found the definition of an 'aggressor nation' on rejection of arbitration. In 1944 the Dumbarton Oaks Conference produced a plan that, unlike the 'call to repentance' of the Covenant, invoked no principles, but contained practical arrangements for restraining an aggressor. The conference looked to a 'Security Council' to decide whether the conduct of a nation amounted to A. and, in fact, alone to shoulder the burden of keeping the peace. These proposals were incorporated in the following year in the Charter of the United Nations. See SAN FRANCISCO CONFERENCE AND UNITED NATIONS CHARTER.

Aggtelek, vil. of Hungary, in Borsod-Abaúj-Zemplén co., 25 m. NNW. of

Miskolc (q.v.). Its famous stalactite caverns, known as the *Baradla* caverns, extend for 14 m. (of which 4 m. are in Czechoslovakia). Another separate cave system has been discovered near by.

Aghrim, see AGHRIM.

Aghuat, El, see LAGHOUAT.

Agia Wood, see ALOES WOOD.

Agincourt (now Azincourt), Fr. vil. in the dept of Pas-de-Calais, 33 m. NW. of Arras. Pop. 110. It is famous for the battle in which the Eng. forces of Henry V defeated a vastly larger Fr. army, 1415. See further under AGINCOURT, BATTLE OF.

Agincourt, Battle of, fought 25 Oct. 1415 between an Eng. army, under Henry V, and a much larger Fr. force, resulting in a decisive Eng. victory, which opened the way for an Eng. conquest of virtually all France.

The battle began with dense flights of arrows from the Eng. archers. The heavily armoured Fr. knights replied with a charge, but their horses sank into the muddy ground and their immobility made them an admirable target for their opponents. The result of the battle was decided within about the first half-hour. Contemporary records make it clear that Henry V had inspired his little army (which had previously marched for 17 days with only one day's rest, covering 260 m. in that time) with a religious, patriotic fervour similar to that with which Joan of Arc was subsequently to inspire the troops under her command.

The French, on the other hand, were clearly over-confident. The battle was ruthless; at one point Henry ordered that no prisoners must be taken. Fr. losses were said to have been about 10,000 killed and 1000 prisoners, including Charles, Duke of Orleans (see under ORLEANS, DUKES OF). Eng. losses were probably a few hundred. Henry V showed great personal bravery in the battle. See A. H. Burne, *The Agincourt War*, 1956.

Aginskoye, Russian vil. in the Chita Oblast of SE. Siberia, 75 m. SE. of Chita, cap. of A. Buryat-Mongol Nat. Dist. (formed 1937), and local cultural centre. Founded 1811. Pop. (1956) 4000.

Agio (It.), term denoting difference between (i) actual and face value of money; (ii) the metallic moneys of different countries; also appreciation or depreciation from fixed rates of exchange.

Agira (formerly San Filippo D'Argiro; anct *Agyrium*), tn of Sicily (q.v.), 15 m. NE. of Enna (q.v.). It has a ruined Norman castle, and has sulphur mines and marble quarries. It was the bp. of Diodorus (q.v.). Pop. 16,200.

Agis, name of 4 Spartan kings, of whom the first is legendary, being supposed to have reigned in the 11th cent. bc. The historical A. I (or II), who reigned 427-397 bc, was a distinguished general, and led the Spartan army at the battle of Mantinea. A. II (or III) (338-331 bc) was a prominent member of the league of the Grecian states against Alexander the Great, and defeated the Macedonians under Corragus. He was killed in battle

at Megalopolis. A. III (or IV), the most noted, who reigned 245-241 BC, endeavoured to remedy the poverty of the Spartans by a system of land redistribution, but his schemes were suspected of being dangerous to the welfare of the state, and he was put to death.

Agistment (law), agreement entered into with an owner of land, whereby the latter, known for the purposes of such agreement as the agistor, allows cattle to pasture and lie on his land; also, the profit accruing to a landowner from such transaction. In this latter sense the word applied formerly more especially to pasturage in the royal forests.

Agitator, in Soviet Russia a person engaged professionally or voluntarily (see ACTIVIST) in the political indoctrination of the people on behalf of the Communist party.

Agnadello, It. vil. in Lombardy (q.v.), 19 m. NW. of Cremona (q.v.). It was the site of 2 famous battles: the defeat of the Venetians by the French under Louis XII (q.v.) on 14 May 1509; and the defeat of Prince Eugène (q.v.) by the French under Marshal Vendôme (q.v.) in 1705.

Agnano, Lake, situated in the crater of an extinct volcano near Naples (q.v.), was drained in 1870 on account of its malarial properties. The waters are now used for remedial baths. On its shore is the famous Grotta del Cane (q.v.).

Agnate (law). *Agnati* signified in Rom. law persons related through males only, *cognati* (cognates) being those in whose relationship one or more female links intervened. The distinction between *agnati* and *cognati* was founded on the peculiar institution of *patria potestas*. See FAMILY and TWELVE TABLES.

Agnatha, class of primitive, fish-like, jawless vertebrates, including the living Cyclostomes (lampreys and hagfishes) and the fossil ostracoderms (q.v.).

Agnes, St. Christian virgin in the reign of Diocletian, was, according to legend, in her thirteenth year publicly humiliated and martyred in Rome for refusing the praetor's heathen son. Her name occurs in the Canon of the Rom. Mass. Her *Acta* are untrustworthy. Her feast is on 21 Jan.

Agnesi, Maria Gaetana (1718-99), It. scientist and scholar, b. Milan. In 1780 she succeeded her father in the chair of mathematics and natural philosophy at Bologna. Her prin. work was the mathematical treatise, *Istituzioni analitiche ad uso della gioventù italiana*, 1748.

Agni, in the Hindu religion god of the fire of sun and lightning.

Agnolo, Baccio d' (1462-1543), b. and d. Florence, where he practised wood-carving and architecture. His prin. wood-carvings are the choir-stalls and organ case at S. Maria Novella, Florence. His chief buildings are the Bartolini and Borgherini palaces in Florence; the Bartolini and Borgherini villas outside Florence; and the *campanili* (bell-towers) of S. Spirito and S. Miniato in Florence. In 1506 he took charge of the building work of the cathedral at Florence.

Agnone, It. tn in Abruzzi e Molise (q.v.), on a W. slope of the Apennines, 22 m. NW. of Campobasso (q.v.). It has copper mines, and sulphur and other mineral springs. Pop. 9600.

Agnosticism, the name invented by T. H. Huxley in 1869 for the doctrine (in itself old) that man does not and cannot in the nature of things know anything about a spiritual existence, either of God or man or of any after-death state. The term would appear to have been suggested to Huxley by the Gk words *agnōstō theō* (to the Unknown God), which we learn from Acts xvii. 23 was the inscription which St Paul found upon an altar in Athens. Certain it is that the teaching of agnostics is fundamentally contrary to that of the Gnostics (q.v.). The latter was an intensely mystical doctrine of the early Christian Church that claimed special revelation of the nature of the divine, whereas the agnostic asserts that man's only cognition can be of the phenomenal world. This is not to say that there may not be a noumenal entity or soul behind the phenomenal—a First Cause—the 'thing in itself' of Kant; in fact, the agnostic would repudiate as dogmatic materialism or atheism (q.v.) the denial of this possibility. His one answer to all such questions is that we do not know and there are so far no reasonable grounds for believing that we shall ever know. In other words man, being finite, can never comprehend the Infinite. In this country A. had many able exponents in the seventies and eighties of last century, chief among them being Huxley, Tyndall, and Herbert Spencer. The 'Belfast Lectures' of Tyndall and Spencer's *First Principles* did much to popularise A., but most of the conclusions of modern A. may be found in the works of Kant, the great Ger. philosopher. Two books for and against the theory are *An Agnostic's Apology*, by Leslie Stephen, 1893, and Dr James Ward's Gifford Lectures, 1899, entitled *Naturalism and Agnosticism*.

See also R. Flint, *Agnosticism*, 1903, and F. von Hügel, *The Reality of God and Religion and Agnosticism*, 1931.

Agnus Dei (Lamb of God), a title of Jesus given in John i. 29. This passage forms one of the prayers in the Canon of the Mass, also called the *Agnus Dei*. The term also denotes the symbol of Christ risen (a lamb supporting a banner), and the waxen tablets bearing this image distributed by the Pope at Easter, and worn as medallions.

Agonic Lines (Gk *a*, without; *gōnia*, angle), irregular imaginary lines on the earth's surface, passing through the magnetic poles on which the magnetic needle shows no deviation or declination, i.e. points true N. and S.

Agora, public market- and meeting-place of auct Gk cities. The most famous is that of Athens which has been excavated, and where the Stoa of Attalus has been restored by Amer. archaeologists. See the *Journal of the American School of Classical Studies at Athens*, 1932 onwards.

Agoraphobia (Gk *agora*, public place;

phobos, fear), neurosis characterised by fear of crowded open spaces.

Agosta, see AUGUSTA.

Agouti, Marie Catherine Sophie de Flaviigny, Comtesse d' (1805-76), Fr. writer, b. Frankfurt. She was educ. in a Paris convent. She left her husband, Comte d'A., to live with Franz Liszt; by him she had 3 children, of whom Cosima married, as her second husband, Richard Wagner. Under the pseudonym Daniel Stern she pub. *Nélida*, 1846, *Lettres républicaines*, 1848, *Esquisses morales*, 1849, and *Histoire de la révolution de 1848*, 1850-3. *Mes souvenirs*, 1806-33, was pub. in 1877 and *Mémoires*, 1833-54, in 1927.

Agouti, S. Amer. rodent of the genus *Dasyprocta*, belonging to the same family as the guinea-pig. It does considerable damage among sugar plantations.

Agra, tn of Uttar Pradesh state, India, situated on the Jumna R., 840 m. NW. of Calcutta. A. was for 150 years the cap. of the Mogul rulers, but was superseded in 1658 by Delhi as the seat of their gov. It was captured from the Mahrattas by Lord Lake in 1803, and was unsuccessfully besieged for some months during the Mutiny. Its most famous feature is the wonderful Taj Mahal (q.v.), the marble tomb built for his favourite wife by Shah Jehan which for sheer beauty is justly accounted one of the wonders of the modern world. Other outstanding architectural features of the city are the Moti Masjid, or Pearl Mosque, and the Jama Masjid, or Great Mosque. In the suburb of Sikandra is the mausoleum of the city's founder, the Emperor Akbar. The old city of A. covered 11 sq. m., half of which is still inhabited; the fort has a circuit of over a mile, with walls 70 ft high. The modern city, which is a busy railway and commercial centre, has fine buildings and hotels, and is well known for its carpets, gold and silver embroidery, and inlay work on white marble.

Agra and Oudh, United Provinces of, see UTTAR PRADESH.

Agram, see ZAGREB.

Agarian Laws, see LAND LAWS.

Agreement, see CONTRACT.

Agricola, Georgius (1494-1555), Ger. metallurgist, his Ger. name being Georg Bauer, b. 24 Mar. 1494 (some biographers give the year 1490, but the best authorities accept 1494) at Glauchau, Saxony, and educ. at Leipzig Univ. Studied philosophy, medicine, and natural science in Italy. Became tn physician in Bohemia in the midst of a mining dist., where he studied the mines and metallurgy. In 1530 there was pub., by Froben at Basel, his dialogue *Bermannus*, a catechism of mining. In 1533—about which time he became city physician of Chemnitz—he issued *De Mensuris et Ponderibus*; and then he began writing his chief work, *De Re Metallica*, which, however, did not appear till after his death. *De Ortu et Causis Subterraneorum*, in 5 books, was pub. 1546. He was a member of the diet of Freiburg, went afterwards on political missions to sev. foreign princes, and attended diets at Leipzig, Torgau,

and Dresden. An Eng. trans. of *De Re Metallica*, by Herbert Clark Hoover (later president of the U.S.A.) and Lou Henry Hoover, was pub. with the original illustrations in a thick folio vol. in 1912.

Agricola, Gnaeus Julius (AD 37 or 39-93), Rom. soldier and statesman, b. Forum Julii (Fréjus). In 59 he served under Suetonius Paulinus in Britain; was quaestor in Asia 63, tribune in 65, praetor in 68. Two years later he was placed in command of the XXth legion in Britain. Returning to Rome in 73, A. was raised to patrician rank (his family had hitherto belonged to the equestrian order), and served as governor of Aquitania from 74 to 78. In 79 he was consul suffectus, and was appointed governor of Britain. Here he spent at least 7 years, consolidating Rom. power, and, in the intervals of campaigning and exploring, contributed much to the romanisation of the prov. His success aroused the jealousy of Domitian, who recalled him to Rome, where he spent the remainder of his life in retirement. Shortly before his appointment to the gov. of Britain A. gave his daughter in marriage to the historian Tacitus (q.v.). See Tacitus, *Agricola* (trans. H. Mattingly), 1948.

Agricola, Johannes (1494-1566), pioneer of Protestantism, also known as **Magister Islebius**, from his bp. Eisleben, was educ. at Wittenberg and Leipzig. Sent by Luther to Frankfurt in 1525, to establish there the reformed religion, he preached awhile in Eisleben. In 1536 he was appointed to a chair at Wittenberg, but was compelled to resign in 1540 owing to his Antinomian controversy with Luther and Melancthon. He left for Berlin, where he became court preacher to the Elector Joachim II of Brandenburg. His best-known work is his famous collection of Ger. proverbs, 1528. See G. Kawerau, *Johannes Agricola*, 1881, and Latendorf, *Agricolae Sprichwörter, ihr hochdeutsche Ursprung*, 1862.

Agricola, Rudolf (1443-85), Dutch humanist, whose real name was Roelof Huysman, b. near Groningen. He was educ. at Louvain, then went to Paris and Ferrara, where he attended the lectures of Theodore Gaza on the Gk language, and at the same time lectured on the language and literature of Rome. He went to Heidelberg in 1482. A. is one of the founders of Ger. humanism, less perhaps through his works than through his personality. He trans. Gk poems into Latin, wrote a biography of Petrarch, and in his last years began to learn Hebrew. Besides being a scholar he was also a musician and a painter.

Agricultural Adjustment Act, Act passed by the U.S. Congress in 1933 in order to assist Amer. farmers. It provided for the setting up of an A. A. Administration to regulate prices of agric. products, partly by subsidising farmers in consideration of restricting cultivated acreage in accordance with a policy of soil conservation, and partly by purchasing and storing surpluses. For these purposes the A. A. Administration spent some

\$500,000,000, annually. It was originally intended to secure reimbursement of the subsidy by taxes on industries engaged in processing agric. products, but the Supreme Court in 1936 declared these taxes void and funds had to be appropriated from other budgetary sources.

Agricultural Credit involves the problem of finding an adequate agric. substitute for the industrial joint-stock method of obtaining working as well as initial capital. These 2 capital needs of agriculture are met by the short-term, the co-operative, and the long-term credit.

Short-term credit is necessary to the farmer to finance marketing operations. Without this credit he may be forced to put his produce prematurely upon an unwilling market in order to meet his immediate liabilities. In the U.S.A. and Australia co-operative marketing associations receive the produce from the growers and make them an advance upon it. In Great Britain the best source of short-term credit is from the joint-stock banks. The security is that afforded by title-deeds, etc., or the loan may take the form of an overdraft. Agric. wealth—stocks and crops—is not a recognised security with a bank, except by a bill of sale, and the publicity attaching to this form of advance prejudices it in the eyes of the farmer.

Co-operative credit in Great Britain had some provision made for it under the Agricultural Credits Act, 1923. It was not successful, owing to the reluctance of the individual farmers to use the provisions, and the State has since withdrawn its financial support. On the Continent the co-operative system on the Raiffeisen model, originating in Germany, has been a conspicuous success, depending on the deposits of a large number of peasant proprietors rather than on the resources of the State, as in Great Britain.

Long-term credit is not the business of the joint-stock bank. In Great Britain there had been no machinery enabling the farmer to obtain long-term or intermediate credit, necessary for farm purchase or permanent improvement. Provision is made under the Agricultural Credits Act, 1928, for long-term loans to be made to farmers by an agric. mortgage loan company, assisted financially by the Treasury. Under this Act the farmer's short-term requirements are also met by a floating charge on his stock and crops available through the banks.

A proposal to inaugurate a Central Land Bank was put forward in the *Report on Agricultural Credit* (Economic Series No. 8), pub. by the Ministry of Agriculture in 1926. The sequel was the creation of the Agric. Mortgage Corporation—the first agric. mortgage bank to be estab. in Great Britain. The corporation is owned by banks and the dividend was limited to 5 per cent, subsequently reduced to 3½ per cent under the Agriculture (Miscellaneous Provisions) Act, 1944. See CO-OPERATION.

Agricultural Holdings (Scotland). In Scotland the prin. Act is the Agricultural

Holdings (Scotland) Act, 1949, which consolidates a series of statutes dating from 1883. As in England a tenant on leaving the holding is entitled to compensation for certain specified improvements. The amount payable is determined, failing agreement, by an arbiter appointed by the Secretary of State for Scotland. Compensation for disturbance and for damage by game is also payable as above. The Act allows a tenant freedom to practise any system of cropping subject to certain safeguards. It also defines the liabilities of landlord and tenant in regard to the provision and maintenance of buildings and other fixed equipment. Elaborate provisions are made for the regulation of notices to quit and the removal of tenants. The effect of this is to render eviction difficult. A tenant has power to bequeath his tenancy to any person subject to the landlord's right to object to the legatee, in which case the matter is decided by the Land Court. If not bequeathed the tenancy passes to the tenant's heir.

Special provisions are made for tenants of small holdings under the Small Landholders Act, of which the prin. one is that of 1911, and for crofters (q.v.).

Agricultural Holdings Act, 1948, consolidating Act which confers on tenants of A. H. a certain measure of security of tenure and rights of compensation for improvements and disturbance: (a) **Security of tenure.** A tenant of an agric. holding must be given at least 1 year's notice to quit. Within a month of service of the notice the tenant may, under section 24 of the Act, serve on his landlord a counter-notice that the notice shall not operate without the consent of the Ministry of Agriculture. Such a counter-notice is ineffective if the notice to quit is expressed to be given for, *inter alia*, breach of covenant, bankruptcy of the tenant, or a certificate of bad husbandry issued by the minister. (b) **Compensation for improvements.** A tenant on quitting his holding is entitled to compensation for new improvements made by him, but generally not if he himself terminated the tenancy. The improvements are classified: (1) long-term improvements for which the landlord's consent is required (e.g. planting of gardens or orchards); (2) long-term improvements for which consent of landlord or approval of minister is required (e.g. reclaiming waste land, installation of electric light or power); (3) short-term improvements for which no consent is required (e.g. chalking, liming, or artificial manuring of land). Compensation under (1) and (2) is the increase attributable to the improvement in the value of the land as an agric. holding. The compensation under (3) is based on the value of the improvement to the incoming tenant. (c) **Compensation for disturbance.** This is payable where a landlord gives notice to quit except for any reason which excludes the operation of a counter-notice. The amount of compensation is usually the equivalent of 1 year's rent, although in certain circumstances a disturbed tenant may

recover a sum equivalent to 2 years' rent. The tenant may claim compensation for damage caused by game which he has no right to kill. An outgoing tenant may, in certain circumstances and on giving notice to his landlord, remove tenants' fixtures.

Agricultural Machinery and Implements have undergone in the 20th cent. a rapid development, chiefly in the direction of adapting mechanical power (steam, petrol, or electricity) to their use. For motive power 3 classes of engines are used: the portable, tractor, and stationary. The portable engine, mounted on road wheels, when not needed for threshing can be belted up to any of the machines used on a large estate for such operations as sheep-shearing, wood-sawing, etc. The tractor is used for ploughing and harrowing, and can haul mowers, binders, etc. Steam ploughing has been largely superseded by motor-tractor ploughing. The type of tractor with a high-speed engine on a light frame certainly has advantages, but the heavy tractor, if the soil can carry it, saves expense in repairs. The stationary engine can be installed in the barn or shed to drive fodder and dairy machines. Generally small petrol engines or electric motors are used.

The various agric. implements may be classified under the following heads:

Tillage implements. Ploughing breaks up the soil into furrows, exposing it to the action of the atmosphere. Most ploughing is now done by tractors, but both plough and tractor must be adapted to the particular soil. Two distinct types of plough are the mouldboard plough and the disk plough, the former being more widely used. The function of grubbers, or cultivators, is to rend the soil with their curved teeth. The newest form of cultivator has a steel frame with sickle tines, able to penetrate the hardest ground. The spike-tooth or drag harrow is used to prepare the seed-bed after ploughing. The disk harrow is suitable for a stubble surface, and the spring-tooth harrow for hard or stony ground. Rollers are used to break up the clods and to smooth the surface after sowing. The most common type is the ring-roller. Various kinds of horse-hoes are used to stir the soil while the crops are still growing, at the same time destroying weeds.

Seeding machines. Seed-sowing machines scatter the seed either broadcast or in furrows, according to the class of seed sown and the crop required. The seed drill deposits the seed in the soil at equal depths, and there is a device for covering the seed with fine soil after it has been deposited. The potato planter can be hand-fed or fully automatic and plants the tubers at regular intervals. The machine may be adapted to apply fertilizer at the same time.

Harvesting Machinery. The self-binder cuts the standing corn and passes the cut corn on to a sheafing deck, where it is bound and knotted and finally ejected on to the ground. For hay harvesting the reaper works in connection with the

swath-turner and collector. There are also machines for loading, stacking, and pressing the hay. For potato-raising the machine is fitted with forks, which throw out the potatoes without bruising or scattering them. The sorter is a machine which grades 5 tons of potatoes per hour in 3 sizes.

Threshing machinery. The thresher separates the grain, chaff, and straw, and each is delivered separately from the threshing machine. The grain is collected in sacks and the straw baled before stacking.

Combine-harvester and pick-up baler. The spread of mechanised farming has led to the introduction of a variety of labour-saving machines, notably those which combine the operations of 2 or more existing ones. Amongst these is the combine-harvester, which combines the 2 operations of cutting and threshing grain (see REAPING). Another machine of this type is the pick-up baler, which picks up hay from wind-rows in the field and packs it into bales.

Manure distributors of various types admit of either broadcasting or drilling, and are able to deal with all kinds of fertilisers. The dung-spreader is simply towed by a tractor and distributes the manure evenly over a large strip of ground.

Food-preparing machines save labour in preparing food for the various animals. Such are grist-mills, chaff-cutters, root-pulpers, machines for slicing and shredding roots, breaking oil-cake, etc.

See also DAIRYING and CULIVNS. See H. J. Hine, *Tractors on the Farm*, 1942, and C. Culpin, *Farm Machinery*, 1952, and *Farm Mechanisation: Costs and Methods*, 1952.

Agricultural Research establishes the fundamental natural principles on which progress in agriculture must be based. It is allied with experimental work, which aims at directly improving farm methods. A. R. began with the experiments carried out in 1834 by Joseph Boussingault (q.v.) on his farm in Alsace. Since then institutes for research in agriculture have sprung up all over the world, and it is now the recognised duty of a state to develop its agric. resources. As regards Great Britain, a development fund was started in 1909 with a capital of £2,000,000, and State grants have been made increasingly to all research stations. A. R. is organised throughout the Commonwealth, and in 1927 an Imperial Research Conference was called with the object of providing 'a stimulus for the development and co-ordination of A. R. overseas in the interest of Empire trade and production.' In England, Wales, and Scotland the research institutes are controlled by independent bodies, usually attached to univ., but dependent on the State for funds. In N. Ireland the work is entirely administered by the Ministry of Agriculture for N. Ireland. The A. R. Council, created in 1931 as part of the organisation for the scientific supervision of Gov.-aided research in all spheres, advises the development commissioners

and the agric. depts upon the application of moneys voted by Parliament for the furtherance of A. R., besides itself promoting research with the aid of funds from Parliament or from any other source.

The problem of agric. science may be classified under the following heads:

Soil. The Rothamsted Experimental Station, founded by Sir T. B. Lawes (q.v.), is famous for its research into the chem. of the soil.

Plant-breeding. The Cambridge Plant-breeding Institute is especially important in breeding new cereal varieties, the general aim being the combination of high yield and good quality. Grassland farming is studied at the Welsh station, Aberystwyth, and the Scottish station, Corstorphine. The testing of new herbage plant strains and other work on pasture is largely the concern of the Grassland Research Station at Hurley.

Plant physiology, referring to the inner processes of growth, is studied at the Research Institute in Plant Physiology, London. Field experiments, allied to this work, with hay, barley, and wheat are conducted at Rothamsted, with oats at Llandudno, Dumfries, and with clover hay at Harper Adams College, Newport, Salop.

Fruit research is centred at Long Ashton, Somerset, at E. Malling, Kent—famous for research in layered root stocks—and at Cambridge, in connection with the fruit-growing area there.

Plant diseases have been combated by practical research throughout the U.K. Pests which affect glasshouse crops are investigated at Cheshunt Research Station.

Stock-feeding, in England, is the concern of the Animal Nutrition Institute at Cambridge Univ., and, in Scotland, of the Rowett Institute at Aberdeen Univ. As part of a pig research scheme, feeding trials are conducted at Harper Adams College.

Animal-breeding is the subject of extensive research at the Physiological Institute, Cambridge, while the work at the research station, Edinburgh, is noteworthy.

Dairying. Clean milk is an outcome of the activities of the National Institute for Research in Dairying, estab. at Reading in 1912. In 1920 a farm of 340 ac. and a dairy herd were acquired. In Scotland the Hannah Dairy Research Institute at Kirkhill undertakes important investigations, particularly into the nutrition and physiology of dairy cattle.

Animal Diseases. The Institute of Animal Pathology is at Cambridge, and the scope of research at the Royal Veterinary College, London, has been enlarged. The London School of Hygiene and Tropical Medicine, which studies animal and plant parasites, is equipped with field laboratories at St Albans. In Scotland the Animal Diseases Research Association, transferred to Moredun, near Edinburgh, now works in conjunction with Edinburgh Univ. In N. Ireland provision for the study of animal diseases is made at the State laboratories at Stormont, Belfast. In Mar. 1924 a committee of pathologists was appointed to investigate foot-and-mouth disease. Research was conducted

at the Gov. laboratories, New Haw, Weybridge, and at the Foot-and-Mouth Disease Experimental Station at Pirbright. See H.M.S.O., *The Agricultural Research Service*, 1953; also reports of individual research stations.

Agriculture (Lat. *ager*, field; *colere*, to cultivate) in the strict sense is the art concerned with tillage of the ground and the raising of crops, but is now generally understood to include every branch of farm practice, upon which all the natural sciences have more or less of a bearing, as epigrammatically summed up in the motto of the Royal Agric. Society, 'Science with Practice.' He who would pursue A., or the allied industries of horticulture and forestry, with the maximum success should not only realise the possibilities presented by advances in science and be conversant with every practical detail, but must also know how best to adapt his methods of procedure to local conditions.

History. In W. Europe, as elsewhere, a great stride was made in civilisation when prehistoric man, during the polished stone or Neolithic age, ceased to be a mere wandering hunter and adopted a more settled life, resulting from his discovery of the possibilities of tillage of the ground and domestication of animals. The Neolithic farmer lived in vil. communities, his habitations being sometimes in the form of lake dwellings; his domesticated animals included the dog, horse, ox, sheep, goat, and pig; his crops included wheat, barley, and millet; and he practised the arts of spinning, weaving, and pottery-making. Such primitive prehistoric beginnings, improved by numerous successive stages, ultimately led to the evolution of the vil. system prevalent in England during Saxon times and for long afterwards. The houses of the villagers clustered together in the centre of an area partly consisting of pasture, but to a larger extent of arable land, divided into 3 fields, one under grain, a second under peas, beans, or grain, and the third fallow, i.e. without a crop, and in a state of preparation for receiving one in its turn. The introduction of potatoes, red clover, and turnips in the 17th cent. marked a considerable advance, and the next cent. was epoch-making in sev. ways. During its latter part the most important name is that of Jethro Tull, who demonstrated the advantage of thorough cultivation of the soil, and initiated the practice of drilling as against broadcasting seed, thus causing the crop plants to grow in rows, the intervals between which can be stirred and cleaned by horse-hoeing. This led to the abolition—in most cases—of bare fallow, largely a device for thorough cleaning of land, and found a place for turnips and other root crops. Hence the replacement of the '3-field' system of the vil. community by the Norfolk or 4-course rotation, initiated by Charles, second Viscount Townshend ('Turnip Townshend'). The cultivation of turnips and other root crops on a large scale rendered possible the winter feeding of cattle, and thus did

away with the extensive use of salted meat during that season, a practice very detrimental to the health of the community. The 18th cent. witnessed great improvements in farm animals, due to the pioneer work of Robert Bakewell, who effected great advances in the quality of horned stock and sheep, largely by means of in-breeding. Among other benefits derived therefrom was a great reduction in the age at which bullocks and wethers were ready for the butcher. In the earlier half of the 19th cent. we find *improved methods of draining land*, largely due to Elkington and Smith. Associated with these advances came marked improvements in tillage implements, and much enclosure of land as a result of the 'new husbandry' rendered possible by Tull's work. During the 19th cent. many advances took place in continuation of those just mentioned, and sev. new lines of progress were initiated, but the years 1815-40 were marked by disastrous agric. depression. The following dates are significant as marking the beginnings of various forms of agric. activity which have had far-reaching results: Bath and W. of England Agric. Society, 1777; Highland and Agric. Society of Scotland, 1784; Chair of A. and Rural Economy in Edinburgh Univ., 1790; Board of A., 1793; Smithfield Club, 1798; Royal Agric. Society of England, 1838; Rothamsted Experimental Station, 1843; Royal Agric. College, Cirencester, 1845. The 19th cent. witnessed the improvement of crops by means of *artificial manures*, dung and various forms of rubbish being the only kinds of fertiliser previously employed. Bones came first, though Sir Humphry Davy (lecturing 1802-12) also mentions phosphate of lime, sulphate of potash, and salts of magnesia. Nitrate of soda and guano were first imported in 1830; superphosphate resulted from the researches of Lawes and Liebig, and began to be used on a large scale in the early forties; potash manures, prepared from the Stassfurt deposits, came later, and were followed by the discovery of basic slag. The *improvement of wheat by crossing* was commenced by Knight towards the end of the 18th cent., and taken up by Maund much later; while Shirreff began to improve cereals by *selection* in 1819, a variation of his method being subsequently practised by Hallett (1857). Practically all kinds of crop plants were improved on similar lines. During the 19th cent. also the necessity of using *clean seed*—first realised in Denmark—was increasingly recognised. The implements of tillage were still further improved; *reaping machines* and other contrivances for harvesting and after-treatment of crops were evolved in profusion, and different forms of *power* employed for working many of them. During the cent. great advances were also made in the knowledge and treatment of *plant diseases*, especially those due to the attacks of parasitic organisms. The rapid improvement in biological appliances (especially microscopes) and technique not only placed the study of *injuriously fungi* on a scientific footing, but also

enabled the science of *bacteriology* to be created, largely as a result of the pioneer work of Pasteur. Bacteria were found not only to be agents of infectious disease, but also to play an important part in the chemical changes which go on in the soil, in dairy processes, and so forth. Equally valuable progress was also made in respect of *livestock*. Many breeds were improved or estab. on Bakewell's lines, and the formation of numerous breed societies in the latter part of the cent. secured the maintenance of high standards. The biological advances above mentioned led to great improvement in the treatment of *animal diseases*, while at the same time the importance of *farm hygiene* came to be realised. *Concentrated foods*, of which linseed cake was the first (1795), gradually came to play an important part in winter feeding and the promotion of early maturity. Gilbert in England and von Wolff in Germany, with many others, placed the feeding of stock on a scientific foundation. (See CATTLE. *Scientific Methods of finding Feeding Standards*.) The invention of the *cream separator* proved of great importance in the improvement of dairy work. A. has continued to make considerable advances during the present cent. on all the lines indicated. The application of *Mendelian principles* to the breeding of plants and animals, especially the former, is leading to considerable results, as in the production of *rust-resisting wheats* by Biffen, improved cereals, etc., at Svalöf, and so forth. Further progress in research, horse-breeding, and education are assured by the estab. of a *Development Fund*.

The soil. Crops derive most of their food from the soil, in the form of a very dilute solution of mineral substances, though the air provides them with carbon dioxide gas and they breathe in its oxygen, while the nitrogen of the atmosphere is fixed for their use by certain soil bacteria and—in the case of leguminous plants—by other forms of the kind living in swellings or nodules on the roots. As, too, animals depend directly or indirectly on plants as their source of food, it is obvious that a thorough knowledge of the soil is essential to the intelligent practice of A. By whatever agencies different soils may have been formed, a certain amount of organic substance, *humus*, due to the decay of organisms, must be present in addition to the mineral particles formed by disintegration in order to secure fertility. The *physical properties of soils* largely determine the rate and amount of growth of crops, and therefore require notice. A particular soil consists of particles of varying size, with narrow interstices between them, collectively forming the *pore space*. Each particle is closely surrounded by a film of water, and it is these films which are utilised as *plant food*. The free water in the interstices is more or less removed by drainage, and if this goes on too slowly a free circulation of air must be promoted by artificial means, especially when a large proportion of clay is present. As the water in the

soil is used up, fresh supplies rise from below by capillary action, which also replaces the loss by surface evaporation. While drainage gets rid of superfluous moisture, it is often necessary in a hot climate or season, more particularly in the case of sandy soils, to *conserve the moisture* present. This is effected by constant stirring of the surface, by hoeing and otherwise, evaporation being thus checked. In some cases *mulches* of decaying vegetation, or other substances more or less impervious to moisture, answer the same purpose. Such conservation is practised to a very large degree in 'dry' farming, a comparatively new system in arid regions, such as parts of the U.S.A. The *temperature* of the soil, partly determined by colour and aspect, is also of importance, more especially because seeds require a certain amount of heat in order to germinate, so that whether a given crop is early or late very largely depends upon this factor. The *classification of soils* is based on their *chemical composition*, and depends upon the proportions they contain of sand (mainly silica), clay (impure silicate of alumina), carbonate of lime, and humus. *Sand* is warm, and easy to drain and till, but apt to become too dry, and but little retentive of plant food. *Clay* is cold, retentive of moisture and plant food, hard to drain, and difficult to work. A proportion of *carbonate of lime* is important, because it furnishes one kind of plant food, helps to break down organic matter, and improves the texture of clay. *Humus* supplies nitrogenous matter, and its presence is associated with important *bacteria*, some of which effect *nitrification* of organic substances—with production of *nitrates* valuable as plant food—while others are *denitrifying agents* and lead to loss of nitrogen. Most soils are of *mixed* character, *loams* being primarily a mixture of sand and clay, while *marls* are made of clay and calcareous matter. Medium loams, with a certain admixture of calcareous material and humus, are the best soils for general purposes.

Improvement of soils is effected in a great variety of ways, the aim being to impart such desirable physical and chemical characteristics as are naturally lacking or deficient. *Artificial drainage* of heavy soils, for example, removes superfluous water and promotes the circulation of air, and in such case *winter ploughing* exposes the clods to the disintegrating action of frost. The lighter soils, on the other hand, require *consolidation*, as by the treading of sheep folded upon them. It may also be said in general that *tillage*, by means of ploughs, cultivators, harrows, and so forth, artificially imitates disintegration by natural agents, and produces a seed-bed of fine texture (tilth) made up of innumerable particles. The application of suitable *manures*, though in some cases of physical importance, is mainly directed to supplying forms of plant food present in insufficient amount, such as—more particularly—lime, nitrogen, phosphorus, and potash. A distinction may here be

drawn between natural and artificial manures. Among the former may be mentioned quicklime, ground limestone, and *farmyard manure*, or *dung*; and among the latter *superphosphates*, *sulphate of ammonia*, and *miriade of potash* (see MANURES). The two liming materials are not only important for soils deficient in calcareous material, but are also valuable in improving the texture of clays and mellowing sour soils by their power of neutralising the excess acids causing sourness.

Crops in the widest sense are divisible into what is broadly termed 'grass' and plants which are grown upon arable land. *Temporary grassland* bears grass, with clover and sometimes other plants, and after a time is reconverted into arable (see LEY FARMING). *Permanent grassland* includes *pastures*, which are grazed but not mown, and *meadows*, which are mown for hay either every year or at less frequent intervals. The *botanical composition* varies with the kind of grassland, and it is obvious that the manurial treatment must also vary, especially when it is remembered that grazing stock effect a certain amount of natural manuring; while meadows do not benefit in this way to the same extent, and the hay crop is a continuous drain upon the resources of the soil without any manurial return. The *seed mixtures* employed when land is laid down to grass are different according as temporary or permanent grassland is the object in view, as also in relation to the kind of soil. In the case of *temporary grass*, rapid growth is of most importance, and perennial species need only be added should it be intended to maintain the area under grass for some years. A 1-year ley may even consist of broad red clover only, a plant which botanically is not a grass at all. The seed mixtures employed for the production of *permanent grass* chiefly consist of grasses and various leguminous plants, to which are sometimes added composites (yarrow), rosaceous species (burnet), and umbellifers (sheep's parsley). Land, before being laid down to grass, should be very thoroughly cleaned, autumn ploughing being followed in spring by harrowing and rolling, by which means a finely divided seed-bed is obtained. It is a common practice to 'nurse' the young grass by sowing it with a corn crop, and sowing is followed by light harrowing and rolling. By mowing the first year, and giving either a complete dressing of dung or a suitable mixture of artificials, the incipient permanent grass will be given a fair start. In subsequent treatment chain-harrowing is of importance for pulling out moss and some injurious grasses, while the manuring varies according to the local character of the soil. Grazing cattle make best use of the grass when they are folded on it behind a fence consisting of an electrified wire attached to posts, which can be moved each day so that the field is grazed in strips. Even without electric fencing good results can be obtained where cattle and sheep are maintained in suitable proportions. Owing to the lack of fresh

grass during the winter months, conservation as hay or silage is important (see HAY AND ENSILAGE).

It is generally recognised that the best results are obtained with crops on arable land when the same kind of plant is not grown continuously in any particular field, but a regular change or *rotation of crops* is practised (see ROTATION OF CROPS).

Cereals. *Wheat* is best suited to soils with a considerable proportion of clay, and does best in a warm dry climate. As in cereals generally, the production of straw as well as grain must be borne in mind when selecting a variety for any particular locality. The choice of a suitable kind of wheat (and the same thing is true for any other cultivated plant) may to some extent be guided by *variety tests*, where different sorts are grown side by side under similar conditions. Nitrogenous manuring is most important but phosphates are often used in addition. Wheat should be harvested before it is quite ripe, and the average yield is about 30 bushels per ac., with 30-35 cwt of straw. *Oats* may be grown on a great variety of soils, and do best in a cool damp climate. They must be harvested before becoming ripe, as the mature grains easily fall out. The average yield is 40-60 bushels per ac., with 30 cwt or more of straw. *Barley*, most important for malting, is most successfully cultivated in the lighter calcareous soils, and in areas where the climate is dry. Owing to the necessity for uniform quality in the grain, the cultural operations have to be unusually thorough and careful. Average yield 32-40 bushels per ac., with about 20 cwt of straw. *Rye* is very little grown as a grain crop in Britain, but yields 24-32 bushels per ac., with 30-40 cwt of straw. It is more often employed as a forage crop, which should be fed off early. It is harder than the other cereals, and thrives in soils and under climatic conditions where these do badly. *Pulse crops.* *Beans* do best on heavy soils, especially when these are of calcareous nature. Potash and phosphoric manures are of most importance, for, like all leguminous plants, beans enrich the soil in nitrogen. The yield is 30-40 bushels, with 25-30 cwt of haulm. *Peas* differ from beans in being better suited to the lighter soils. The average yield is about the same. **Root crops.** *Mangel* is adapted to stiff soils and a dry climate. Very thorough preparation of the soil and after-cultivation are necessary. The average yield is 15-25 tons per ac. *Sugar-beet* is closely allied to mangel, and needs the same kind of treatment, but more labour is required, for the cultural operations have to be carried out with great attention to details. Attempts have now been made for some years past, with aid of a Gov. subsidy to promote the growing of sugar-beet on a large scale in Britain, and there appears to be no difficulty in raising the crop. *Fodder beet* is derived from a cross between sugar-beet and mangels and is a fodder root with a high dry matter content. Average yield 20 tons per ac. *Swedes* are

a valuable variety of the turnip, and belong to a different natural order (Cruciferae) from that (Chenopodiaceae) including mangel, so that it is not surprising to find their requirements somewhat different. They thrive best in the lighter soils, and in a cool climate, provided plenty of moisture is available. The crop is shallow-rooted, and phosphatic manure is the one most necessary. Yield 12-20 tons per ac. *Turnips* proper are comparable to swedes in most respects, but give on the average a larger yield, though not so valuable for feeding purposes. *Carrots*, a valuable crop for feeding horses and dairy stock, are only suited to light soils free from weeds, and require a fine seed-bed. The cost of production is considerable. Average yield 10-20 tons per ac. *Farnips* are a similar crop, but, being tolerant of frost, can be left in the ground until wanted. Average yield 8-14 tons per ac. *Potatoes* are best suited to deep loose soils with a moderate amount of humus, but they can be successfully grown on almost any soil—except those of the heaviest kind—by adapting the treatment. They vary from early to late according to the time of maturity, and the production of the first kind is a very paying industry. The crop is usually propagated by 'sets,' which are either the entire tubers (thickened underground branches or portions of the same, including at least one 'eye' (bud). After a time a variety so cultivated begins to deteriorate, and fresh kinds are constantly being raised from seeds produced by crossing, though only a small proportion of these are of economic value. Manurial treatment may be by dung alone, by a complete mixture of artificials, or—and best—by a mixture of the two. Potash is particularly essential. Average yield 6-15 tons per ac., or less in the case of early potatoes. *Kohl rabi*, *thousand-headed kale*, and *cabbages* are cruciferous forms which, though they do not produce thickened underground parts, may broadly be classified with the root crops, and receive much the same treatment. They are very healthy, resist frost and drought, are extremely nutritious, and can be transplanted, thus increasing the time for cleaning the land. Average yield per ac.: kohl rabi, 20-5 tons; thousand-headed kale and cabbage, 20-40 tons. *Cruciferous forage crops.* Strictly speaking, a forage or fodder crop is one grown for the feeding value of its stems and leaves. The last 3 crops named are therefore sometimes included here. *Rape* is cultivated in much the same way as turnips, and *white mustard* is often grown as a summer catch crop, i.e. a crop which is not part of a regular rotation, but grown in an interval. It is obvious that rapidly growing plants are best suited for this purpose. The average yield per ac. of the 2 preceding crops is 10-15 tons. *Leguminous forage crops.* *Velches* or *tares* are grown to provide spring or summer fodder, and are a common catch crop. Potash manure is most essential, and some form of phosphate is usually added. When grown for

seed the average yield is 25-30 bushels per ac., with about 25 cwt of haulm. *Lucerne* and *sainfoin* are perennial deep-rooted species suited to loams of calcareous nature. They may either be used for forage or converted into hay. *Crimson clover*, commonly known as *trifolium*, is a catch crop sown for the production of forage in the spring and early summer. *Clovers* and '*seeds*', i.e. various clovers plus grasses, constitute an important course in rotation, sown with a cereal, or somewhat later, and coming into use a year afterwards. *Weeds* are plants belonging to various natural orders which are harmful in the main, using up nutrient matters to the detriment of crops, and helping fungoid and insect pests to tide over unfavourable seasons. It has been shown experimentally that they may reduce the yield by as much as one-half. They are best kept down by using clean seed and keeping land in a high state of cultivation, to which a locally suitable rotation conduces in no small degree. The use of the hoe on arable land, constant cutting of thistles on grassland, and spraying charlock with MCPA, may be mentioned as typical examples of remedial measures.

Farm stock. These chiefly consist of horses, cattle, sheep, goats, and swine. *Horses* are divided into *light breeds*, including thoroughbreds, hunters, hackneys, ponies, Clevelands, and coaching horses; and *heavy breeds*, to which belong shires, Clydesdales, and Suffolks. Horses, especially the heavy breeds, are of declining agric. importance as tractor numbers increase (see HORSES). **Cattle.** Nearly a score of breeds are officially recognised in Britain, some of which are valued as beef-producers, others for milk, and still others for both purposes. Among the first kind may be mentioned Aberdeen-Angus (black), Galloway (black), Hereford (red), Highland (black), N. Devon (red), and Sussex (red). *Dairy breeds* are Ayrshire (various), Friesian (black and white), Jersey (fawn), Guernsey (yellowish), and Longhorn (various). *Dual-purpose cattle* are Dexter (black), Kerry (black), Red Poll (red), Shorthorn (and Lincoln Red) (various), S. Devon (yellowish), and Welsh (black). (The predominant colours are given in parentheses.) *The polled* or hornless breeds are Aberdeen-Angus, Galloway, and Red Poll. *Longhorns* are particularly interesting because they were greatly improved by the pioneer breeding work of Bakewell, but their horns were against them, and they were superseded by the Shorthorns. The latter, now more widely favoured than any other breed, first rose into prominence in the latter part of the 18th cent., owing to the production of a famous Durham strain by the brothers Colling. Other notable strains were subsequently estab. in Yorks by Booth and Bates, and in Aberdeenshire by the brothers Cruickshank (see CATTLE). The feeding and management of cattle are difficult arts, affording opportunity for the display of much skill and intelligence. The modern farmer is aware that the requirements of

farm hygiene cannot be safely neglected, and the choice of concentrated feeding-stuffs is now so large that the difficult question of *mixed rations* is receiving increasing attention. *Dairying* has reached a high pitch of perfection, especially in Denmark and other foreign countries—Canada, New Zealand, and Australia—the branch least successful financially—in Britain—being butter production. Sev. important factors have conduced to the modern development of the industry, and these include improvement of stock, rational feeding and management, and the keeping of *milk records*, so that the worth of individual cows may be accurately known. The cream separator and other machines, and the introduction of power in large dairies, have reduced the labour bill and enabled some of the work to be effected in an improved manner. Even more important results have followed from the discovery that dairy processes are largely dependent upon the action of *bacteria*, some of which are beneficial and others harmful. Strict *cleanliness* in all stages is the best method of combating the latter. By the employment of *artificial cultures* of cream-ripening (lactic acid) bacteria it is possible to ensure butter of uniform quality, and this point has told strongly in favour of the Dan. and Ger. products, which have competed so successfully against us in our home markets. The standard of stock, for both milk and beef, is being improved by artificial insemination by pedigree bulls: this service is under the control of the Milk Marketing Board. See DAIRY and DAIRY FARMING.

Sheep are conveniently grouped into: 1. *Longwool breeds*—Cotswold, Devon Longwool, Kentish or Romney Marsh, Leicester and Border Leicester, Lincoln, Roscommon, S. Devon, and Wensleydale. 2. *Shortwool breeds*—Clun Forest, Dorset Horn, Hampshire Down, Oxford Down, Ryeland, Southdown, Shropshire, and Suffolk. 3. *Mountain breeds*—Black-face Mountain, Cheviot, Exmoor, Herdwick, Limestone, Lonk, and W. Mountain. See SHEEP.

Pigs are divided into Whites, Blacks, Berkshire (black with white points), Tamworth (golden-red), and Lincoln Curly-coated. As users of waste they play an important part in A., and are invaluable to the cottager and the small holder. Owing to their comparatively small stomachs they require concentrated food, given at frequent intervals. Some of the best results are obtained from cross-bred animals.

Fungoid pests and bacteria. The lower forms of plant life known as *fungi*, and the still simpler microscopic *bacteria*, are unable to subsist on the simple compounds sufficing for ordinary green plants, the living substance of which, aided by the characteristic green pigment *chlorophyll*, can utilise the energy of sunlight for building up complex substances from water, carbon dioxide gas, and certain mineral matters. Fungi and bacteria, in fact, somewhat resemble animals in their

way of feeding, and are either *saprophytes* (e.g. mushrooms), depending on dead organisms or the products of their decay, or else *parasites*, which prey upon living ones. Many of the latter attack cultivated plants and domesticated animals, and are therefore very detrimental to A. They propagate by means of dust-like *spores*, which are readily disseminated by the wind. Rusts are able to inflict losses of the most serious kind upon cereals and grasses, and the estab. of resistant varieties appears to be the most promising method of combating them. *Smuts* are fungi which prevent the formation of grains, these being replaced by powdery black spores. *Oat smut* (*Ustilago avenae*) may be checked by treating the seed grain with organo-mercury disinfectants. *Bunt* (*Tilletia caries*) is nearly related to the preceding, but is distinguished by its greasy nature and unpleasant fishy smell. *Ergot* (*Claviceps purpurea*) attacks rye and meadow grasses, causing the grains to be replaced by hard spur-like bodies. These are particularly objectionable because they cause abortion in cows and ewes. *Potato blight* (*Phytophthora infestans*) attacks all parts of the potato plant, and is a pest of the most serious kind. Spraying with Bordeaux mixture (dilute solution of copper sulphate and quicklime) is the best method of treatment, especially as a preventive measure. *Black scab or wart disease* (*Synchytrium endobioticum*) is due to a fungus of doubtful affinities, and is so serious as to be notifiable. Destruction of infected tubers and thorough disinfection of the soil are necessary, and the planting of a different crop for a time is highly advisable.

Speaking generally, fungoid pests of plants are best combated by high farming and rational rotations, by which vigorous and healthy plants are produced, able to resist the attacks of parasitic fungi, especially in the critical early stages of growth. A knowledge of the life histories of injurious forms often indicates the methods which can most advantageously be employed in dealing with them.

Animal pests. Among *mammals* the most pernicious forms are probably rats, mice, and voles, which all belong to the order Rodentia (gnawers). Rats and house mice are omnivorous, while field mice, harvest mice, and voles are vegetarian. All are exceedingly prolific, and when favoured by local circumstances some of them—especially *field voles* (*Microtus agrestis*)—may make their appearance in vast numbers and become veritable plagues. *Rats* are objectionable in another way, for they help to disseminate the disease known as *trichinosis*, due to minute thread-worms, while some of the fleas which infest them are known to spread the germs causing *oriental plague*. In coping with injurious rodents their natural enemies—such as owls and weasels—should not be ruthlessly hunted down as ‘vermin’. Ferrets, traps, poisons, and forms of ‘virus’ (bacterial cultures) are all employed, with varying success. Only a systematic campaign, supported by legislation, is likely to

achieve anything like full success. *Hares* and *rabbits*, which are also rodents, may do much damage to crops, and the ravages of the latter in Australia are matters of common knowledge. Recently the deliberate or accidental spread of a virus disease—myxomatosis (q.v.)—has done much to reduce the rabbit populations of Australasia and Europe.

Wild birds have a varied relation to A. Some are wholly or mainly beneficial, others are undoubtedly harmful in the main. Nor must it be forgotten that species are liable to change their habits. *Starlings*, for example, at one time predominatingly beneficial, have begun to attack fruit in some dists. It may be remarked in passing that the interests of the farmer and fruit-grower are not identical in this direction, for birds which may be useful to the former are pests to the latter. Among birds entirely or mainly beneficial are game birds, birds of prey (except the sparrow-hawk), owls, swallows, martins, swifts, and cuckoos. More or less harmful are the sparrow-hawk, pigeons and doves, hooded crow, bullfinch, greenfinch, hawfinch, house sparrow, blackcap, and other warblers. *Molluscs*, especially field slugs, are able to do considerable damage. Repeated applications of quicklime are here to be recommended. *Insects*, owing to their extraordinary variety, great powers of rapid propagation, and powers of flight, are among the most serious foes with which the farmer has to contend. Many of them have a complicated life-history, hatching out as a voracious larva (e.g. caterpillars of butterflies and moths), which passes into a pupa or resting stage, capable of remaining dormant through the unfavourable season of the year, and giving rise in spring to the adult or imago. *Beetles* constitute an exceptionally large order, including many pests. The cockchafer, for example, lives below the surface as a larva (grub), feeding upon roots and underground stems. When adult it devours foliage. *Wireworms*, the subterranean larvae of click-beetles, are especially notorious, but can now be controlled by chemical means using ‘Aldrin.’ Turnip ‘fly’ is in reality a small beetle, and various long-snouted weevils attack the roots, flowers, or seeds of sev. crops. The Colorado beetle, whose grubs and adults both eat potato leaves, is a dangerous visitor from abroad. By the exercise of drastic measures this pest has so far been prevented from establishing itself. Some beetles, however, are useful, such as the little ladybirds, the larvae of which devour large numbers of plant lice (aphides). The order (Hymenoptera) including bees and wasps embraces the harmful sawflies, which in the larval stage infest turnips and various fruits. But we must not forget the benefits conferred by bees, important fertilising agents, while the hive-bee yields honey and wax. The ichneumon flies also do much service by laying their eggs in the eggs or larvae of many injurious forms, thus bringing about their destruction. Butterflies and moths (Lepidoptera)

are almost always injurious, for their larvae (caterpillars) are among the most serious enemies of crops. The extensive order of *bugs* (Hemiptera) includes many injurious forms, of which those variously termed *green fly*, *plant lice*, or *aphides* are perhaps the most notorious. They attack cabbages, turnips, beans, potatoes, hops, cereals, and other crops, and are probably the most prolific insects. The *two-winged flies* (Diptera) are in many cases injurious to both crops and stock. Of those injurious to crops, the *crane-flies* or *daddy-longlegs*, with their underground larvae, are most universally known, while the *Hessian fly*, *corn-midge*, and *frit-fly* attack cereals. Probably the most injurious member of the order infesting stock is the *ox-bot* or *warble-fly*, of which the larvae live in the skin of cattle, damaging the hide, and reducing the value of the meat ('licked beef'). *Preventive measures* directed against insect pests include the high farming and rational rotations also useful in connection with fungoid infestations. The grease-banding and tarring of fruit-trees are means of arresting the ascent of wingless female moths (e.g. winter moth) from the ground, where the pupae are found. *Spraying* and *dusting* are important remedies, the poisons used varying according as the pests possess biting (e.g. beetles) or sucking (e.g. plant lice) mouth parts. The aim in the former case is to poison the food, and in the latter to block up the breathing pores of the insect or otherwise destroy it by contact. *Spiders*, destroying as they do many injurious insects, are decidedly beneficial. *Mange*, *scab*, and *itch* are examples of animal diseases due to the presence of these pests. Mites infesting plants are combated in much the same way as insects. The notifiable disease called *sheep scab* is caused by a parasitic mite (*Psoroptes communis*), and is dealt with by means of various dips. *Ticks* are large mites which suck the blood of domesticated animals, and are not only directly injurious in this way, but may also introduce the germs of diseases (Texas fever of horned stock, and probably louping ill in sheep). In some parts of the world, e.g. E. Africa, they are exceedingly detrimental and often fatal to stock, but regular treatment with suitable dips seems likely greatly to further the interests of A. in such regions. The farmer has to contend with a host of parasitic worms, some of which are able to inflict serious losses. The notorious *liver fluke* (*Fasciola hepatica*) is sometimes found in large numbers in the liver and hepatic ducts of sheep, causing 'liver rot.' The parasite has a very complicated life-hist., and part of its existence is spent in a small water snail (*Limnaea truncatula*) often found on damp low-lying land liable to be flooded. The best precautionary measures consist in thorough drainage and proper control of the drinking water. *Tapeworms* (*Taeniae*), when adult, generally live within the small intestine of man or domesticated animals ('final hosts'), absorbing the digested food found therein. Two tapeworms highly injurious to stock

live when adult in the intestine of the dog. The bladderworm stage of one (*T. coenuus*) is found in the form of large cysts on the surface of the sheep's brain, and is responsible for the disease variously known as *staggers*, *gid*, or *sturdy*. The huge compound cysts of the other (*T. echinococcus*) are found in the liver or other abdominal organs of man and various hoofed mammals. It is clear that an accurate knowledge of the life-hists. of parasites such as those enumerated is essential for coping with them successfully. Some of the lowly microscopic creatures known as *Animalcules* (Protozoa) are the cause of *malarial diseases*, part of the life-hist. being passed within the bodies of *dapple-winged mosquitoes* (*Anopheles*), the bites of which cause infection of the blood of human beings. As the larvae of mosquitoes live in stagnant water, it has been found possible, in some places, to get rid of malarial diseases by drainage, or by pouring petroleum into ponds infested by the larvae. A number of particularly deadly blood diseases of human beings and stock are caused by Protozoa, which in a certain stage of their existence are known as *trypanosomes*. The chief agents of infection are flies and ticks. In tropical Africa the bites of certain *tsetse flies* (*Glossina*) lead to *nagana* or *fly disease* of horse and ox, and *sleeping sickness* of human beings. Most likely a *gad-fly* introduces the germs of *surra* into Indian ruminants.

From what has been said regarding pests of all sorts it will be gathered that there is almost unlimited scope for scientific research, and upon this almost entirely depends the agric. development of tropical regions now rendered unhealthy by malarial diseases, or uninhabitable by serious parasitic maladies such as sleeping sickness.

Agriculture during and since the First World War. During the First World War sev. temporary Acts were passed with a view to increasing the amount of home-grown corn in the country. These included the Small Holdings Colonies Act, 1916, which provided for the purchase of land by the State for experimental small-holding colonies; the Corn Production Act, 1917, which made provision for payments to growers of corn where the average price of wheat or oats was less than the minimum, and for a minimum rate for agric. wages, and gave power to the Board of A. to enforce proper cultivation; and the Agricultural Land Sales (Restriction of Notices to Quit) Act, 1919. The weakness of the U.K., however, in this its oldest industry was emphasised by the war. Notwithstanding that the command of the seas remained with the Brit. Navy in so far as the unrestricted Ger. U-boat warfare failed to account for more than a certain percentage of mercantile shipping, the shortage was much more acute than it would have been had A. been in a flourishing condition immediately before the war. In spite of various Acts, such as those designed to encourage town-dwellers to go back to

the land, the state of A. in the U.K. grew steadily worse. The Corn Production Act was repealed in 1921 and depression soon followed. Corn markets were adverse, with the result that the acreage of ploughland gradually diminished. By 1927 the area of ploughland in England and Wales had declined by about 700,000 ac. since the opening year of the war, and in Scotland by some 20,000 ac. The state of A. in Great Britain, in face of adverse economic forces, became critical in 1927, and chief hope was reposed in agric. credits. By the Agricultural Credits Act, 1923, the Ministry of A. is empowered to organise agric. credit societies or, in other words, approved societies registered under the Industrial and Provident Societies Act, 1893, having for their object the making of advances to members for approved agric. purposes. The Agricultural Credits Act, 1928, provides for loans secured on farming stock or other assets, through a company formed out of public funds. Provision was made by the Agricultural Development Act, 1939, for increasing the resources of this company.

High costs and low prices in the first decade after the war spelt losses and a generally uncertain outlook for Brit. A., which led, in 1930, to persistent agitation for Gov. intervention. The large stocks of grain produced in Canada, the U.S.A., and Argentina had an increasingly detrimental effect on the prospects of A. in Great Britain, and in some quarters a tentative suggestion was made for reciprocal arrangements with the Dominions, whereby foreign wheat should be subject to a tariff for the benefit of both Dominion and home-grown grain. Other critics as emphatically advanced the theory that better marketing arrangements were the real panacea, and in any event a far more scientific remedy than the much-boomed policy of 'free trade within the Empire.' Similarly, in the U.S.A., A. became an urgent national economic problem requiring solution, according to different schools of thought, by such measures as the tariff, improved transportation, and the formation of a Federal Farm Committee to devise remedies in the way of co-operative marketing and clearing-houses for agric. products. As in Britain there was a growing realisation of the ramifications of A. and an appreciation of the fact that it was by no means a single industry, capable of regeneration by a simple panacea, but rather a congeries of specialised and mutually exclusive industries, depression in any one of which must have its repercussion on the rest. Thus remedies by a single legislative measure were not widely advocated, while attention became more closely centred on scientific research and on investigation of the causes of depression.

The Wheat Act of 1932 provided a standard price for farmers of 10s. per cwt for millable wheat sold to an approved buyer; the difference between this price and the average ann. market price was paid to growers from a fund raised by a levy on every sack of flour produced.

Under the Ottawa Agreement Act, 1932, the Board of Trade in consultation with the Ministry of A. could regulate the importation of frozen meat and chilled beef. At the same time some forms of production, e.g. sugar beet, were encouraged by a direct subsidy. By the Agriculture Act, 1937, a price insurance scheme was provided for barley and oats. For livestock a subsidy was introduced as a temporary measure in 1934, but prices remained low and so the subsidy was put on a permanent basis by the Livestock Industry Act of 1937. Marketing was generally badly organised, but the Agricultural Marketing Acts of 1931 and 1933 enabled the producers of any agric. product to set up a marketing board, elected by them, which could exercise considerable control over marketing. Boards were actually set up for hops, potatoes, milk, and bacon pigs, though the last had an extremely chequered career.

Generally speaking it may be assumed, however, that world conditions before the Second World War produced a second industrial revolution in which supply had outrun consumption. Prices might be artificially raised through quantitative regulation of imports, combined with measures calculated to secure a better organisation of different sections of the industry; but the opinion was widely held that more drastic measures were required to put the country on a footing that would ensure that it could rely on itself for its food supplies for any length of time in an emergency.

With the advent of war the need arose for immediate price control and food rationing coupled with a high level of home production of the staple foods such as milk and wheat.

After the Second World War, however, the damage caused by the war and the dislocation of agric. production led, in 1946, to a serious fall in the world production of wheat. A large number of countries, including the largest producers of grain, had reaped abnormally small crops, and the world was faced with conditions which threatened famine, besides setting back all plans for reconstruction. But apart from abnormal conditions modern A. always requires assistance from research in agric. science and from improvements in agric. machinery. Many farms in Great Britain have been worked out and would, under present conditions, prove too costly to restore to a profitable state of cultivation. Soil, too, even under rotation cultivation, needs replenishing with expensive manures, and the cost both of manuring and draining poor soil is prohibitive. Legislation to assist farmers to increase the fertility of their land was exemplified in the Agricultural Act of 1937, and after the war the need for further legislation of this type was readily apparent.

The Agriculture Act, 1947. In principle, a largely agreed measure arising out of wartime consultations. It came before Parliament at the end of 1946, as the most comprehensive and far-reaching

effort that any gov. has made to deal with A. and the use of land for food production. The Act seeks to provide stability through guaranteed prices and assured markets. In this context Part I of the Act sets out the proposed machinery for promoting and maintaining the lasting basis for 'a stable and efficient agricultural industry capable of producing such part of the nation's food as in the national interest it is desirable to produce in the United Kingdom, and of producing it at minimum prices consistent with proper remuneration and living conditions for

estate management or bad husbandry, and such matters as directions served on owners to provide fixed equipment, consent to notices to quit, and the div. of farms. The decision of these tribunals is in all cases final. Another part of the Act deals with the provision of more small holdings by co. councils for men with previous agric. experience. All the legislation on land tenure was consolidated by a single Act, the Agricultural Holdings Act of 1948.

Organisation of agricultural education in Britain. Although in many ways Great



'Farmer & Stock-breeder' photograph

PICK-UP BALING

farmers and workers in agriculture, and adequate return on capital invested.' The products covered by guaranteed prices and assured markets include live-stock, milk, eggs, grain, potatoes, and sugar-beet, but not horticult. crops. As regards husbandry, the Act seeks to encourage the farmer who takes good care of his land while obtaining a full output. The tenant who improves his farm is assured fuller compensation when he leaves; and as a corollary the tenant whose farming is not up to standard gets shorter shrift. The Agric. Land Commission is responsible for the management of land taken over by the Ministry of A. The Co. Agric. Executive Committees are continued as the ministry's agents on the same basis as before; and there is also an Agric. Land Tribunal for each area of England and Wales, to which are referred questions of the dispossession of owners and occupiers on the grounds of bad

Britain is still behind such countries as the U.S.A., Germany, Denmark, and Sweden, considerable progress was made before the First World War in agric. education, upon which the future of A. so largely depends. The twofold system of univs. and colleges for higher education and the co. council courses for young persons, which now prevails, was merely the putting into execution of plans which were far advanced before the First World War, but stopped by that period of disturbance. These plans envisaged the replacement of the pre-existing and chaotic work of a large number of authorities of various kinds by an imitation of the Scottish system of agric. provs., with depts of the univs. at the head of each. Scotland has 3 such provs., under the univs. of Aberdeen, Glasgow, and Edinburgh. It was proposed to divide England and Wales into 12 provs., with a central institution at the head of each,

the institutions being Aberystwyth Univ. College, Bangor Univ. College, Bristol Univ. (with the associated Royal Agric. College), Cambridge Univ., Harper Adams College, Leeds Univ., Midland Agric. College, Armstrong College, Newcastle-on-Tyne, Reading Univ. College (now Univ.), Seale-Hayne College, Newton Abbot, Manchester Univ. (with the associated college at Holmes Chapel), and Wye College (part of London Univ.). This organisation has now been adopted, and 2 other institutions have been added, namely Oxford Univ. and Nottingham Univ., making 14 institutions in all where the higher teaching and research are to take place aided by experimental stations at Rothamsted, Woburn, and elsewhere. Closely correlated with, and looking for advice to, the central institution in each 'province' are the 'farm institutes' (as was proposed before the First World War), broadly similar to those which have for some time been estab. at Basing, Ridgmont, and Newton Rigg, and are well known in other countries. The site of these institutes has been fixed in accordance with the nature of local farming, and with due regard to convenience of access. The univs. and colleges provide courses of 2 to 4 years in duration, with diplomas or degrees. As advisory centres they employ specialists in chem., entomology, and the like, as contradistinguished from the general education given by technical instructors under the co. councils. These latter bodies provide short courses for boys and girls already on the land or intending to return to it. The farm institutes usually give a 6 months' winter course in practical A. to young persons of 16 years of age and upwards, and in summer courses in dairying and poultry farming. Some co. councils, however, have organised only a more economical and less efficient system of evening lectures and day classes, without the obvious advantage of facilities for actual practical training on neighbouring farms where various 'demonstrations' and 'experiments' of agric. importance are conducted. Under the Agricultural Land (Utilisation) Act, 1931, for promoting the better utilisation of agric. land in Great Britain and the settlement of unemployed persons on it, the Ministry of A. is empowered to acquire and hold land for use as demonstration farms. All this work is under the control of the Ministry of A., Fisheries, and Food, but the system is made complete by linking up certain activities of the Ministry of Education, especially the imparting of a 'rural bias' to rural elementary and secondary schools. This concentration on a 'rural bias' takes the form of giving lessons in geography with special reference to the physical characteristics of the dist., effect of climate, and the like, but compulsory further education would greatly promote the ends in view.

See also AGRICULTURAL CREDIT; AGRICULTURAL HOLDINGS ACT, 1948; AGRICULTURAL RESEARCH; AGRICULTURE, INTERNATIONAL INSTITUTE OF; AGRICULTURE IN U.S.A.

Bibliography. GENERAL AND HISTORICAL: J. A. R. Marriott, *The English Land System*, 1914; Lord Ernle, *English Farming, Past and Present*, 1936; K. G. Stapledon, *The Land Now and Tomorrow*, 1946; W. Frearm, *Elements of Agriculture*, 1955; J. A. S. Watson and J. A. More, *Agriculture: The Science and Practice of British Farming*, 1956. SOILS AND FERTILISERS: E. W. Hilgard, *Soils*, 1906; B. A. Keen, *The Physical Properties of the Soil*, 1931; F. H. Billington, *Compost for Garden Plot or Thousand-acre Farm*, 1942; J. S. Remington, *The Manure Note Book*, 1943. CROPS: J. Percival, *Agricultural Botany, Theoretical and Practical*, 1936; N. B. Bagenal (ed.), *Fruit Growing: Modern Cultural Methods*, 1945; H. G. Sanders, *An Outline of British Crop Husbandry*, 1949; H. I. Moore, *Grassland Husbandry*, 1950. FARM STOCK AND BREEDING: K. Wallace and J. A. S. Watson, *Farm Livestock of Great Britain*, 1923; F. H. Garner, *The Cattle of Britain*, 1944; E. T. Brown, *The Poultry-keeper's Text-book*, 1944; J. Anderson, *The Semen of Animals and its Use for Artificial Insemination*, 1945; A. L. Hagedorn, *Animal Breeding*, 1954. PESTS AND PLANT DISEASES: W. E. Branchley, *Weeds of Farm Land*, 1920; J. Ritchie, *Beasts and Birds as Farm Pests*, 1931; E. D. Sanderson, *Insect Pests of Farm, Garden, and Orchard*, 1941; F. T. Brooks, *Plant Diseases*, 1953. DRAINAGE AND BUILDINGS: B. W. Adkin, *Land Drainage in Britain*, 1933; H. H. Nicholson, *The Principles of Field Drainage*, 1942; E. Gunn, *Farm Buildings: New and Adapted*, 1945. ECONOMICS AND MARKETING: J. A. Venn, *The Foundations of Agricultural Economics*, 1933; J. T. Horner, *Agricultural Marketing*, 1935; R. Cohen, *The Economics of Agriculture*, 1949. See also bibliographies for AGRICULTURAL MACHINERY AND IMPLEMENTS; CATTLE; DAIRYING; HORSES, etc.; pubs. of the Ministry of A. and Fisheries, and of the various agric. societies.

Agriculture, Fisheries, and Food, Ministry of (M.A.F.F.). Until they were amalgamated in 1955 the Agriculture and Fisheries and Food Ministries were quite distinct. Food control (q.v.) by a govt. dates from 1916, but the present constitution of the ministry probably allows for closer co-ordination of food and agric. policy than ever before. The Ministry of A. and Fisheries owes its origin to the Board of A. set up in 1793 by Pitt's govt. The prime mover in its formation and first president was Sir John Sinclair, and Arthur Young was the first secretary. Soon after Sinclair had retired Young went blind, and such was the influence of these two men that after they had gone the board receded in importance and was dissolved in 1822. It was re-instated in 1889, became the Board of A. and Fisheries in 1903, and was raised to ministry status in 1919. The M.A.F.F. is controlled by a minister having cabinet rank and of course he is appointed by the political party in power. The salary is £5000 per annum and that of the parli. secretary is £1500. The ministry has

responsibilities under sev. Acts, the most important being the Agriculture Act of 1947. It controls the agric. and horticult. interests of the country, having Co. Agric. Executive Committees (C.A.E.C.s), the National Agric. Advisory Service (N.A.A.S.), veterinary, pest control, and livestock improvement depts. In addition there is a fisheries dept and a forestry dept, the ministry being assisted in the latter by the Forestry Commission (q.v.). Also the running of the Fatstock Marketing Organisation is very important, having both agric. and food interests. The position and functions of the ministry, taking into consideration the recent amalgamation of the food and agric. sections, have been reviewed by a committee headed by Sir Arton Wilson and its findings have been pub. (Cmd 9732).

Agriculture, International Institute of, founded at Rome in 1905 by David Lubin. Its long and useful career was not seriously interrupted till the advent of the Second World War. In setting up the I. I. A. Lubin perceived the need for international action by govts. in certain classes of problems and a permanent international secretariat to sustain and inform that activity. Although its membership was large, one weakness was the lack of representation from the Amer. and Asian countries. However, much useful information was collected on all aspects of A. This was pub. in its international year-books of agric. statistics and legislation and also in monthly bulletins of science and practice, agric. economics, etc. One of its greatest achievements was to initiate and organise the first world agric. census in 1930; a second planned for 1940 was partially interrupted by the war. The I. I. A. must be regarded as one of the stepping stones leading to the Conference on Food and A. in 1943 at Hot Springs and the subsequent setting up in 1945 of the Food and A. Organisation (q.v.). See also AGRICULTURE. See Food and Agriculture Organisation, *So Bold an Aim*, 1955.

Agriculture in U.S.A. Practically every known kind of field crop is cultivated in the U.S.A., but maize, hay, wheat, oats, cotton, and soya beans represent over three-fourths of the total value of all Amer. crops. In America there are ample land and water resources, although the inherently fertile land is restricted to the 'corn belt' of the Mid-W. and the Mississippi delta. The land under crops and grass (excluding range, i.e. rough grazings) averages 2½ ac. per head of the pop. (compared with ½ ac. in this country). According to the 1950 census there are 5,382,100 farms in the U.S.A. and 20 per cent of the pop. is engaged in agriculture. The value of farm products sold ranges from \$2000 to over \$25,000 per farm per year, but on most is between \$2000 and \$10,000. A. was hard hit by the depression of 1921-4 and full recovery has only been attained in recent years.

After the Second World War most of the farmers' gains were devoted to meeting post-war conditions—a large market, lower prices, and less labour. A. in

America has developed rapidly along the lines of mechanisation, and thus a greater production has been obtained on a smaller crop acreage and with fewer workers. The future tendency of A. is towards larger farms and greater technical improvements both in farm machinery and in the scientific care of crops and livestock. The most stable and important of Amer. crops is maize, the yield in the years 1939, 1947, and 1950 being 2342, 2137, and 2760 million bushels respectively, which represents more than half the world's supply. The 6 most productive states of the 'corn belt' are Iowa, Illinois, Nebraska, Missouri, Indiana, and Ohio, but Indian corn is widespread over the whole of the U.S.A. The flourishing stock-breeding industry depends largely on the corn crop, of which about 85 per cent is fed to livestock, chiefly hogs. The forage crops, which are second in importance, include pasture, hay, clover, alfalfa, etc. The third most important crop, cotton, is dealt with under that head. The wheat crop, fourth in importance, covers about 61½ million ac., principally in the states of Kansas, N. Dakota, Minnesota, Nebraska, S. Dakota, Washington, Illinois, Oklahoma, Indiana, Ohio, and Missouri. Amer. and Canadian wheat is called winter wheat or spring wheat, according to the season of sowing. Winter wheat represents nearly three-quarters of the Amer. produce, and the yield of both kinds was 1019 million bushels in 1950. The U.S.A. is the largest wheat-growing country in the world, and in addition produces a quarter of the world's supply of oats, thereby equalling Russia. The average ann. oats crop is over 1200 million bushels, half of which is produced in Illinois, Iowa, Wisconsin, Minnesota, Nebraska, and Indiana. Other important Amer. crops with their average yield in millions of bushels are barley (304), sorghums (233), rice (86), linseed (40), and rye (21). In addition there are the legume crops, field beans, soy beans, and peas, while the white potato crop is 430 million bushels and the sweet potato crop 50 million bushels. Of the fruit production, apples and peaches form the largest share. In addition to field crops, the U.S.A. is the largest stock-breeding country in the world, the estimated figures for 1950 being 80 million cattle, 60 million swine, and 30 million sheep. Tobacco, in 1950, was harvested from 1,600,000 ac. producing 2030 million lb. It is grown in over a score of states, but chiefly in N. Carolina, Kentucky, Virginia, Tennessee, S. Carolina, Georgia, and Pennsylvania.

Agricultural education in the U.S.A. had its beginnings in the efforts of private individuals interested in the productivity of the land. Comparatively early in the last cent. vocational training in A., as indeed in other industries, was a feature of the manual labour schools in New York state. By the latter part of the 19th cent. co. agric. schools had become well established, and in the first decade of the present cent. over 50 agric. high schools were in

existence, while agric. courses were given in hundreds of ordinary high schools. The system now comprises agric. schools, dist. agric. schools, agric. depts of high schools, and ordinary schools giving instruction in elementary A. At the apex of the system of agric. education in the U.S.A. are the agric. colleges or state colleges and univs. in direct association with the U.S. Dept of A. These institutions are mainly concerned with research and experiment, this latter function being carried out at stations organised by the dept under the Hatch Act of 1887. See A. N. Duckham, *American Agriculture: Its Background and its Lessons*, 1952.

Agrirento: 1. Prov. of Italy, in SW. Sicily (q.v.). It is generally mountainous, and is broken up by fertile riv. valleys; the chief rivs. are the Magazzolo, Platani, and Sulso. There is an undulating coastal plain in the S. Cereals, fruit, olive-oil, sulphur, salt, and fish are produced. The prin. tns include A., Sciacca, Caltabellotta, and Canicattì (q.v.). Area 1173 sq. m.; pop. 484,000. See PELAGIAN ISLANDS.

2. (formerly **Girgenti**; Gk **Akragas**; Rom. **Agrium**). Tn in Sicily, cap. of the prov. of A., 57 m. SSE. of Palermo (q.v.). It is on a hill near the S. coast. A Gk colony from Gela (q.v.) founded in 582 bc, it became one of the richest and most splendid cities of the anc. world; it was destroyed by the Carthaginians in 405 bc and, though rebuilt by Timoleon (338), never regained its former greatness. It was the bp. of the philosopher Empedocles (q.v.). Chief among the magnificent buildings which adorned the S. slopes of A. were 5 great temples ranging in date from c. 510 to 210 bc. There were 3 dedicated to Zeus, Heracles, and Asclepius, remains of which may still be seen, and 2 others wrongly called 'of Hera' and 'of Concord'. A. became subject to Rome in 210 bc. Roger I (q.v.) took it from the Saracens (q.v.) in ad 1086 and founded a bishopric. It was severely damaged during the Second World War. A. has a cathedral (13th-15th cents.) and other fine buildings, but the tn is chiefly remarkable for its magnificent Gk and Rom. remains. There is a harbour SW. of the tn at Porto Empedocle. Pop. 40,600.

Agrimonia, genus of the Rosaceae, commonly known as *agrimony*. It has medicinal properties, and is used in herb teas. *A. odorata* and *A. eupatoria* are found in fields and under hedges.

Agrinion, **Vrachori**, or **Vrachochori**, tn of Acarnania and Aetolia, Greece, 18 m. N. of Missolonghi. A. is the centre of a tobacco- and currant-growing region. Pop. 21,750.

Agrippa, **Herod**, see **HEROD** (4).

Agrippa, **Marcus Vipsianus** (63-12 bc), Rom. general, naval commander, statesman, and builder, b. of humble family. He was studying with Octavian at Apollonia in 44 bc when news came of Caesar's murder. It was by A.'s advice and in his company that Octavian promptly set out for Italy, and the subsequent achievement of Augustus was largely due to A.'s energy and ability.

His meteoric career may be summarised as follows. 38 bc, quelled an Aquitanian rising and undertook a punitive expedition against Ger. tribes beyond the Rhine; 37, consul for the first time; 36, commanded the fleet against Sextus Pompeius, whom he defeated at Mylae and Naulochus; 33, as aedile, did much to beautify Rome, as well as to improve its drainage and water supply; 31, was largely responsible for Octavian's victory at Actium; 27, consul for the third time, when he built the Pantheon, now the church of San Stefano in Rotondo. From this time until his death he was employed in various commands in the E. (23-21) and Spain (19); in 18 he was given tribunician power for 5 years. A. was married 3 times. His first wife, Pomponia, daughter of T. Pomponius Atticus (q.v.), d. or was divorced before 28 bc, in which year he married Octavian's niece Marcella. He was obliged to divorce her in 21 and to marry the emperor's daughter Julia, by whom he was father of Agrippina, wife of Germanicus. A. is known to have written an autobiography and some geographical works; but his most important achievement in this field was the carrying out of the great survey planned by Julius Caesar.

Agrippa von Nettesheim, **Heinrich Cornelius** (1486-1535), Ger. philosopher and occultist, had a varied and troublous career as writer, soldier, physician, and lecturer. His prin. works are *De Incertitudine et Vanitate Scientiarum*, 1527, and *De Occulta Philosophia Libri Tres*, 1531. The former was trans. by James Sanford in 1569, and the latter probably by J. Freake in 1651 (ed. W. F. Whitehead, 1898). See life by H. Morley, 1856.



AGRIMONY

Agrippina the Elder (d. ad 33), daughter of M. Vipsianus Agrippa and Julia, daughter of Augustus, endeared herself to the Rom. populace by bravery displayed in the Ger. campaigns of her husband Germanicus. On the mysterious death

(AD 17) of the latter, believed by some historians to have been engineered by the jealous Tiberius, her popularity aroused the emperor's hatred, and she was banished to the isle of Pandataria, where she is supposed to have starved herself to death. She was the mother of the notorious A. the Younger and Caligula. See Tacitus, *Annals*; S. Baring-Gould, *Tragedy of the Caesars*, 1892; J. B. Bury, *Roman Empire*, 1895.

Agrippina the Younger (AD c. 15-59), daughter of Germanicus and Agrippina, b. Oppidum Ubiorum (afterwards Colonia Agrippina, modern Cologne); mother of Nero by her first husband, Gnaeus Domitius Ahenobarbus, (d. AD 40). Her second husband, Crispus Passienus, she was accused of poisoning. She married thrice her uncle, the Emperor Claudius, and induced him to set aside his own son, Britannicus, in favour of Nero. She then had him poisoned, and Nero became emperor under her regency. Tiring of her ascendancy, Nero had her slain. See Tacitus, *Annals*, xii-xiv.

Agropyron, family Gramineae, genus of tough, perennial herbs or grasses, of which *A. repens*, the quitch, scutch, twitch, or couch-grass, is often a troublesome weed; with persistent rhizomatous roots; *A. caninum* is Bearded Couch-grass, *A. donianum*, Don's Twitch of Scottish Mts, and *A. junceiforme*, Sand Couch-grass of dunes, all natives of Britain.

Agrostis, family Gramineae, genus of perennial grasses, of which *A. canina*, Brown Bent-grass, *A. tenuis*, Common Bent-grass, *A. gigantea*, *A. setacea*, and *A. stolonifera*, the Florin of pastures, are Brit., often used for lawn-making.

Agtelek, see AGTELEK.

Aguadilla, seaport in Puerto Rico, standing on a beautiful bay of the same name, 70 m. W. of San Juan. It has a large trade in coffee, sugar, tobacco, fruit, and cotton; it manufs. straw hats and cigars and there are sugar milling and fishing industries. It was founded in 1775. Pop. 18,276.

Aguardiente (burning water), coarse kind of Sp. brandy, made from the grape or molasses or from grain or potatoes.

Aguas Calientes, tn and state, Mexico, so called from hot springs in the vicinity. The tn, 364 m. NW. of Mexico city, has a considerable trade and industry and is noted for its beautiful fruit gardens and fine climate. Pop. (tn) 88,200; (state) 188,000.

Ague (O. F. *ague*, sharp), term applied to malarial fever, particularly to the variety in which a paroxysm of intense chill, causing shivering and chattering of the teeth, alternates with a hot stage, when the face is flushed and the skin hot to the touch. See MALARIA.

Aguesseau, Henri François d' (1668-1751), Fr. lawyer, b. Limoges, was in succession advocate-general (1690), procurator-general (1700), and chancellor of France. He lost the chancellorship in 1718, through his opposition to Law's system of finance, recovered it in 1720, lost it again in 1722, and assumed the

office for the last time in 1737. According to Voltaire, he was the most learned magistrate France ever had. He made many judicial reforms.

Aguilar, Grace (1816-47), novelist and historian, b. at Hackney of Jewish parents. Her chief works are *The Spirit of Judaism*, 1842, *The Jewish Faith*, 1845, *The Women of Israel*, 1845, and the novel *Home Influence*, 1847.

Aguilar de la Frontera, Sp. tn in the prov. of Córdoba. It has a Moorish castle, and produces oil and white wine. Pop. 16,000.

Aguilas, Sp. seaport in the prov. of Murcia, on the Mediterranean. It has large smelting works, and exports lead, iron ore, sulphur, esparto, and grain. Pop. 17,000.

Aguinado, Emilio (b. c. 1870), Filipino revolutionary leader. At the outbreak of the 1896 rising he was mayor of Cavité Viejo, but, in consequence of the part he took in the rebellion, consented to go into exile at Hong Kong. He returned in 1898 to aid the U.S.A. against Spain, but turned against them on their purchase and annexation of the Is., and attacked Manila in Feb. 1899. Fighting continued with varying success till Mar. 1901, when A. was captured by Gen. Funston at Palawan. He swore allegiance to the U.S.A. the next month, and retired into private life until 1935, when he was an unsuccessful candidate for the presidency. Accused in 1945 of collaboration with the Japanese during the Second World War, he was arrested, but never came to trial.

Agulhas, Cape (The Needles), most southerly point of Africa, so called by the Portuguese from its sharp-pointed rocks. It is dangerous to shipping, on account of fogs, rocks, and uncertain currents. The A. Bank, with an average breadth of 40 m., stretches for 150 m. from the cape to the Great Fish R. It was on the A. Bank that the *Birkenhead* (q.v.) was wrecked. A 100-ft lighthouse has been erected with a light of 12,000,000 c.p. visible at 18 m.

Agustina (d. 1857), the 'Maid of Saragossa.' A *vivandière* of the Sp. Army, she became famous for her bravery during the siege of Saragossa by the French, 1808-9. See Byron's *Childe Harold*.

Agyrium, see AGIRA.

Ahab, son of Omri and 6th King of Israel (874-853 BC), married Jezebel, the daughter of Ethbaal, King of Sidon, and through her influence introduced the worship of Baal. This and the subsequent persecution of the priests and prophets of Yahweh brought him into conflict with Elijah. Though lacking in moral courage, A. united considerable personal courage with a public spirit shown in the construction of fine buildings. He twice defeated the Syrians, but was finally killed in battle with them at Ramoth-Gilead. See 1 Kings xvi and xxii, and R. Kittel, *History of the Hebrews* (Eng. trans.), 1895-6.

Ahasuerus: 1. The traditional name of the Wandering Jew.

2. The biblical name of sev. Persian kings of whom the best known, the

husband of Esther, has been identified with Xerxes (485-464 BC). The name is probably a title.

Ahaz, 11th King of Judah (742-726 BC). He was attacked in 735 by the kings of Israel and Syria, and gravely imperilled his kingdom at a critical time. With little faith in Yahweh, he sought to placate the gods of his dangerous neighbours, and offered his son in sacrifice to Moloch; he summoned to his assistance Tiglath-Pileser, King of Assyria, who exacted from him heavy tribute. His full name, Jehoahaz, is given in an Assyrian tribute list. The prophets Isaiah and Micah lived in his day. See 2 Kings xvi; Isa. vii.

Ahaziah: 1. Son of Ahab and 8th King of Israel (853-852 BC), like his father an idolater, worshipped Baal and Astarte. When about to attempt to suppress the Moabites, who had revolted on his accession, he was fatally injured by a fall from a window (1 Kings xxii and 2 Kings i).

2. 6th King of Judah (841 BC), nephew of the foregoing, killed in the insurrection under Jehu (2 Kings viii; 2 Chron. xxii).

Ahimelech, Jewish high priest at Nob, fed David with the shewbread and gave him the sword of Goliath to help him escape from Saul (1 Sam. xxi. 1-10). He was put to death by Saul (1 Sam. xxii. 11-20).

Ahitophel, see ACHITOPHEL.

Ahlen, Ger. tn in the Land of N. Rhine-Westphalia (q.v.), 60 m. NE. of Düsseldorf (q.v.). It has textile and metal manufs. Pop. 33,000.

Ahlqvist, August Engelbrekt (1826-89), Finnish linguist. Prof. of Finnish in Helsingfors Univ. (1863-88). When 21 he was a co-founder of the national cultural magazine *Suometar*. In his extensive travels through Finland, Estonia, Livonia, Courland, E. Russia, and Siberia he studied numerous Ugro-Finnish languages. He has also written important works on the structure and phonetics of Finnish. Under pseudonym Oksanen he wrote romantic-patriotic poetry (*Säkeitä*, 1860 and 1868, etc.); some of his poems became national songs.

Ahmadabad, or **Ahmedabad**, city of Bombay state, India. On the Sabarmati R., 306 m. N. of Bombay, this former stronghold of the N. Jains (q.v.) was founded in 1411 by Sultan Ahmad I of Gujarat. It is notable for the extent and beauty of the many remains of its historical magnificence. It is now a main centre of the cotton trade and manuf. Pop. 788,310.

Ahmed I (1589-1617), Sultan of Turkey, succeeded his father, Mohammed III, in 1603. The most notable events of his reign are the conclusion of the Peace of Sitvatorök with Austria in 1606 and an unsuccessful war with Persia.

Ahmed II (1643-95), Sultan of Turkey, succeeded his brother Solymán II. His forces, under Kiuprili, were driven from Hungary after their crushing defeat at Slankamen, 1691.

Ahmed III (1673-1736), Sultan of Turkey, succeeded his brother Mustapha II in 1703. The most notable events of

his reign are the war with Russia, the recovery of Morea from Venice in 1715, and the two defeats by the Austrians, at Peterwardein, 1716, and Belgrade, 1717. He was deposed in 1730.

Ahmed Fuad, see FUAD I.

Ahmed Shah, first monarch of Afghanistan (1747-73), son of Sammaun Khan, chief of the Abdali tribe. After the murder of his master Nadir Shah he retired to Afghanistan, where he was elected ruler. He was a fine soldier and greatly extended the Afghan dominion.

Ahmednagar, or **Ahmadnagar**, tn of India, 120 m. E. of Bombay, now in Maharashtra state. A. was founded in 1494 by Ahmed Nizam Shah. It was captured from the Marhattas by Gen. Wellesley in 1803, but restored to them. It was finally ceded to the British in 1817 by the treaty of Poona. The Emperor Aurungzeb d. here in 1707. A. is a considerable centre for local trade and has for long been the home of large Christian missions, both Brit. and Amer. Pop. 54,000.

Ahmes, see AMARIS I.

Aho, Juhani (1861-1921), pseudonym of Johannes Brofeldt, Finnish writer and journalist, b. Lapinlahti. He visited Paris in 1889, and was much influenced by the Fr., Scandinavian, and Russian realist writers. His earliest sketches were written in Paris; in 1897 appeared *Panu*, a patriotic romantic story of Christianity and paganism in 17th-cent. Finland. A. produced a number of books of stories and novels, travel books, and memoirs, and 2 plays (*Panu*, 1903, and *Tuomio*, 1907).

Ahoms, see ASSAM.

Ahriman (Pahlavi for the Avestan *Angra Mainyu*, 'enemy spirit'), the god of evil and darkness, opposed to Ormazd (q.v.), the god of goodness and light, in Zoroastrianism and the religion of the Parsees (q.v.). The defeat of A. is assured but must be assisted by man, if man is to attain blessedness. See R. P. Sanjana, *Zarathushtra and Zarathushtrianism in the Avesta*, 1906, and C. Gore, *The Philosophy of the Good Life* (Everyman's Library), 1930.

Ahuachapán: 1. Dept in El Salvador, Central America. The fertile valleys of the Coast Range produce sugar, coffee, tobacco, cotton, and fruit. Area 804 sq. m.; pop. 94,750.

2. Cap. city of dept of same name, 47 m. NW. of San Salvador. Pop. 11,000.

Ahvaz, dist. and tn of Khuzistan, prov. of Persia. The tn is situated on the R. Karun. Pop. of tn 72,000.

Ahvenanmaa (**Åland**) Islands, the chief is. in an archipelago of the same name consisting of more than 6500 is., islets, and skerries, at the entrance to the Gulf of Bothnia, forming part of Finland. Only a few are inhabited. Taken from Sweden by Russia in 1809 and bombarded by the Allies in 1854, in 1921 A. I. were neutralised and demilitarised under a convention signed by Great Britain, France, Italy, and all the Baltic states except Russia, and the forts razed. A plebiscite taken in the same year was

favourable to self-gov., but the is. now form part of the rep. of Finland and enjoy a large measure of autonomy.

In 1939 an agreement was concluded between the Finnish and Swedish Govs. for the remilitarisation of the is., and approved by the signatories of the 1921 convention, but action was blocked by Soviet opposition. The is. are of the greatest strategic importance because they dominate the entrance to Finland and N. Sweden. Pop. 28,000.

Ahwaz, see AHVAZ.

Ai (Heb., 'heap'), Canaanite city, the modern Et-Tell, 1 m. E. of Bethel and about 15 m. from Jericho. Abraham pitched his tent between Bethel and Ai (Gen. xii and xiii), but the city is better known for its capture by Joshua in later times (Joshua vii and viii). Its ruins existed in the time of Eusebius and Jerome, but are now lost.

Ai (slith), see BRADYPUS.

Aicard, Jean François Victor (1848-1921), Fr. author, b. Toulon. His works, mainly poetical and dramatic, include *Poèmes de Provence*, 1873, and *La Chanson de l'enfant*, 1876, both crowned by the Fr. Academy; *Miette et Noré*, 1880; *Jésus*, 1896; *Maurin des Maures*, 1908, and *L'illustre Maurin*, 1909, both trans. by Alfred Allinson, 1910; *Le Témoin* (poems), 1916, and *Forbin de Sollires* (play), 1920. His best novels are *Roi de Camargue*, 1888, *L'Amé d'un enfant*, 1898; and *Tatas*, 1902.

Aidan, St (d. 651), monk of Iona, was in 635 sent by the abbot on the request of King Oswald of Northumbria to evangelise that country. This he achieved with remarkable success from Lindisfarne, where he ruled as bishop and abbot. His feast is on 31 Aug.

Aide-de-Camp (Fr., 'camp-assistant'), an officer attached to the personal staff of an admiral or general, with whom he is in confidential touch when on active service, assisting him in all the military routine and looking after his comfort. The sovereign may have any number of A.s., and this position is given as an honorary distinction. The usual abbreviation is A.D.C.

Aidin, see AYDIN.

Aidone, tn in Sicily (q.v.), on the Serra Orlando Mts., 14 m. SE. of Enna (q.v.). Near by are extensive remains of an unknown city. Pop. 8000.

Aids, under the feudal system, were payments due from vassal to lord under certain conditions.

Aids, Hearing, see DEAF AND DUMB. *Mechanical aids to hearing.*

Aigues-Chaudes, see EAUX-CHAUDES.

Aigues Mortes (Lat. *Aquae Mortuae*), Fr. tn in the dept of Gard. Now 3 m. from the Mediterranean, it was in the Middle Ages an important port, from which its founder, Louis IX (q.v.), twice sailed for the Crusades. Its anc't walls remain. Pop. 3300.

Aiken, Conrad Potter (1889-), Amer. poet and novelist, b. Savannah, Georgia. Son of a doctor, he was at Harvard with T. S. Eliot, and in 1914 pub. a vol. of verse, *Earth Triumphant*. In 1929 his

Selected Poems won the Pulitzer Prize and the Shelley Memorial Award. Later books of poetry were *The Soldier*, 1944, *The Kid*, 1947, and *Skylight One*, 1949; in 1953 his *Collected Poems* appeared, and in 1956 *A Letter from Li Po*. Subtle psychology is shown in his novels *Blue Voyage*, 1927, *Great Circle*, 1933, and *King Coffin*, 1935.

Aiken, co. seat of A. co., S. Carolina, U.S.A., 17 m. ENE. of Augusta, Georgia; it is a health resort and trade and industrial centre (lumber milling, kaolin shipping, printing). Pop. 7000.

Aikin, John (1747-1822), author, b. Kibworth, Leics. He studied medicine at Edinburgh and London, later taking the degree of M.D. at Leyden, 1870. Besides practising at Chester, Warrington, and London he wrote voluminously. Among his works are *Evenings at Home*, written in conjunction with his sister, Mrs Barbauld (q.v.), and his *General Biography*, 1799-1815.

Aikin, Lucy (1781-1864), authoress, daughter of John A. (q.v.), b. Warrington. She wrote a novel, *Lorimer*, 1814, but her reputation rests mainly on her series of court memoirs, of which *Memoirs of the Court of Elizabeth*, 1818, was the first, and on her life of Addison, 1843.

Ailanthus, or **Ailanto**, genus of deciduous tropical trees, family Simarubaceae. *A. altissima*, China, the tree of heaven, is cultivated in Britain; the leaves are like those of the ash. The wood is valuable to cabinet-makers.

Ailleboust, Louis de Coulonge (d. 1660), 3rd Governor-General of Canada (1648-1651). It is believed that he landed in Canada with the founders of Montreal in 1642. Be that as it may, he represented the Montreal dist. in 1647 in the new colony's council at Quebec prior to succeeding Montmagny as Governor-General in 1648. In his tenure occurred the destruction of the Huron nation by the Iroquois. A. belonged to the 'Compagnie de Montréal' formed in 1641.

Ailly, Pierre d' (1350-1420), Fr. theologian and prelate, was a famous leader of the Nominalists. He became chancellor of the univ. of Paris, Bishop of Compiègne, and papal legate in Germany. He took part in the Council of Constance.

Ailsa Craig, rocky islet of columnar basalt off the W. coast of Ayrshire, Scotland, in the form of a cone, rising abruptly from the sea to a height of 1114 ft. There is a lighthouse at the S. tip. Curling stones are quarried here.

Aimard, Gustave (1818-83), Fr. novelist, b. Paris. He spent 30 years of his life roving through Central America and Asia. He made use of the materials thus collected in writing novels of the Fenimore Cooper type, such as *Les Trappeurs de l'Arkansas*, 1858, and *Les Pirates de la prairie*, 1859. Many have been trans. into Eng. See *Indian Scout*, Everyman's Library.

Aimoin (d. 1008), Fr. Benedictine monk and historian, who wrote a hist. of the French up to 654, which gives an account of the manners and customs of the time.

Ain: 1. Fr. riv. rising in the Jura Mts, and flowing SW. through the depths of Jura and Ain, to join the Rhône 18 m. above Lyons. Length 118 m.

2. Dept on the E. frontier of France, bounded W. by the Saône, and S. by the Rhône. The plains of the N. and W. yield cereals and market-garden produce, and there is much breeding of livestock, including poultry. The S. is swampy, and only partially drained. There are vineyards in the valleys of the Jura Mts in the E. There are hydro-electric schemes, and a considerable plastics industry. The prin. tns are Bourg (the cap.), Belley, Gex, and Nantua (qq.v.). Area 2248 sq. m.; pop. 311,950.

Ain Tab, tn of Asiatic Turkey, 65 m. N. of Aleppo. It was once an important military post, and is now a flourishing centre of Amer. mission work. Trade, hides and leather. Pop. (Turkish, Armenian, and Gk) 45,000.

Ainaboli, see INEBOLI.

Ainger, Alfred (1837-1904), b. in London, graduated from Trinity College, Cambridge, in 1860. In 1866 he was appointed reader at the Temple Church, in 1877 canon of Bristol, in 1894 Master of the Temple. He is best known as the biographer and editor of Charles Lamb. His works include *Crabbe*, 1903, and *Lamb*, 1882 (revised 1888), in the English Men of Letters series, and various articles in the *Dictionary of National Biography*. See his *Life and Letters* by Edith Sichel, 1906.

Ainley, Henry Hinchliffe (1879-1945), actor, b. at Morley, Yorks, descended from mining stock. While working in a Sheffield bank he became an amateur actor, and later went to Frank Benson for training and experience. George Alexander, struck with his fine physique and voice, cast him, still unknown, to play Paolo in Stephen Phillips's tragedy *Paolo and Francesca* in 1902. As a romantic juvenile actor he conquered America as 'The Little Minister' in Barrie's play. Under Granville-Barker he obtained invaluable experience in styles as diverse as those of Gk tragedy and Shavian comedy, passing from the name-parts in Euripides' *Hippolytus* and *Orestes* to that of Valentine in *You Never Can Tell*. Meanwhile at Stratford he kept up his Shakespearian work, and in Granville-Barker's Shakespearian revivals (1912) at the Savoy he reached the highest point of his acting in his Leontes and Malvolio. He was also excellent as Joseph Surface and charming as Little Billie in *Tribby*. He had now perfected his vocal range, which made him the greatest verse speaker on the stage, while his majestic bearing enabled him to invest his parts with a physical quality denied to others. In 1913, under Barker, he reflected brilliantly the nervous realism of the shy artist Ilam Carve in Arnold Bennett's *The Great Adventure*; *Quinney's* at the Haymarket was another success. After serving as a gunner in the First World War he was associated with Gilbert Miller in management at St James's. During the next 10 years his most notable successes were in Milne's

The Dover Road, Irvine's *The First Mrs Fraser*, and James Bridle's portrait of an Edinburgh surgeon, *The Anatomist*. His last appearance on the stage was in 1932.

Ainmiller, or Ainmüller, Maximilian Emanuel (1807-70), b. Munich, where he was a glass-painter. Discovering various technical improvements, he extensively revived the art of glass-painting. His works include windows in St Paul's Cathedral, London, and in Glasgow Cathedral.

Ainsworth, William Francis (1807-1896), b. at Exeter, graduated in medicine at Edinburgh in 1827. He then conducted some geological researches in the Auvergne Mts and the Pyrenees, after which he travelled for some years in Asia, visiting Kurdistan. On his return, in 1838, he pub. *Researches in Assyria*, and later *The Claims of the Christian Aborigines in the East*, 1843, and *Travels in the Track of the Ten Thousand Greeks*, 1844.

Ainsworth, William Harrison (1805-1882), historical novelist, b. Manchester, where his father was a solicitor. He was to have followed the same profession, but he had little liking for it. He came to London to finish his studies and met there John Ebers, a publisher who was manager at that time of the Opera House; he thus met a great number of literary and musical people, and his charming manners found him many friends. His first successful novel, pub. in 1834, was *Rookwood*, the hero of which was Dick Turpin, and from that time to 1881 he pub. about 40 novels. Some of these appeared in *Bentley's Miscellany*, *Ainsworth's Magazine*, and the *New Monthly*, while he was editor of these papers between the years 1840 and 1854. Among his friends were Dickens, Thackeray, Talfourd, and Cruikshank, who illustrated sev. of his novels. His best-known novels are *Rookwood*, 1834, *Crichton*, 1837, *Jack Sheppard*, 1839, *The Tower of London*, 1840, *Old St Paul's*, 1841, *The Miser's Daughter*, 1842, *Windsor Castle*, 1843, *The Lancashire Witches*, 1849, and *The Flitch of Bacon*, 1854. See S. M. Ellis, *William Harrison Ainsworth and his Friends*, 1911.

Aintree, vil. and par. of Lances, England, 6 m. NNE. of Liverpool. At A. is the racecourse where the premier Eng. steeplechase, the Grand National, is run each Mar., and also a noted motor racing circuit. Pop. 4500.

Ainus, dying race now found chiefly in the is. of Hokkaido (Japan) and Sakhalin. They were probably one of the aborigines of Japan, and early Jap. hist. tells of fierce conflicts with them. They are now almost intermingled with the Japanese. The A. are tall, strong, and very hairy, though there is no ground for the tradition that their bodies are covered with hair. Their cheek-bones are high, their noses flat and broad, and their faces short. They are primarily hunters and fishers. Their prin. object of worship is the bear, though they pay no respect to the life of this animal, which they kill and skin without any fear, setting up its head in their vils. They believe, however, in a

Supreme Creator and also in the immortality of the soul. They have no written literature; recently, however, their epics and myths, handed down orally, have been recorded and studied by Dr K. Kindaichi and his school.

The A. differ in physique, language, and customs from the other Asiatic races, and are generally considered to have Caucasoid ancestry, being classified as Proto-Caucasoids (see RACE). See J. Batchelor, *The Ainu and their Folklore*, 1901, and *Ainu Life and Lore*, 1927; L. H. D. Buxton, *The Peoples of Asia*, 1925; G. P. Murdock, *Our Primitive Contemporaries*, 1934; G. Montandon, *La Civilisation ainoue*, 1937.



AINUS
Paul Popper

Air, or **Asben**, fertile but mountainous region of the Sahara, situated between lat. 17° and 20° N. and long. 7° and 10° E. The pop. consists mostly of Tuaregs (q.v.). Cereals and dates are extensively cultivated, and vegetation is luxuriant. An important caravan passes annually through the tn of Asben. A. is the most populous part of the Sahara. Chief tn Agades (q.v.).

Air, the atmosphere we breathe (see ATMOSPHERE); the characteristic or soprano part of a musical composition (see ARIA and MELODY); the bearing or manner of a person; in the plural, affected manners.

Up to the middle of the 18th cent. A. was thought to be a simple elementary substance, of which all other gases were modifications. Hence oxygen was first of all spoken of as 'dephlogisticated A.'

nitrogen as 'phlogisticated A.' hydrogen as 'inflammable A.' and carbon dioxide as 'fixed A.' The idea of modifications of the atmosphere is still preserved in the use of such terms as 'mountain A.', 'sea A.', etc.

A. is now known to be a mixture of gases, consisting approximately of 4 vols. of nitrogen to 1 of oxygen, with smaller quantities of carbon dioxide, water vapour, argon, helium, neon, krypton, xenon, ammonia, dust, sulphuric acid, etc. Carbon dioxide, though present in small proportion (0.03 per cent by vol.), is nevertheless of great importance, as it forms the chief food of green plants.

A. may be liquefied and even solidified by the application of great pressure combined with an extremely low temp. (see LIQUID GASES). Compressed A. is used as a curative agent (see AEROTHERAPEUTICS), as an explosive or propellant (see AIR-GUN), as a dielectric in a form of Leyden jar (q.v.), and as a motive power in various forms of machinery, such as the boring machines used in tunnelling through the Alps and elsewhere (see TUNNELLING).

Air-bath, oven heated by gas or steam, used in practical chem. for removing water from a substance.

Air-bed, bed consisting of an envelope of rubber fabric distended with air. It is used principally for bedridden patients who are apt to develop bedsores. The bed is usually divided into compartments, into each of which air is pumped through a valve. When deflated the bed can be folded up.

Air - bladder, or **Swimming - bladder**, structure in some fishes which is filled with gas and serves as an organ of flotation. It occurs in the position occupied in air-breathers by the lungs, but is in most instances developed dorsally from the fore-gut, whereas the lungs are a ventral outgrowth. It is usually connected with the pharynx or the gullet by a duct, and therefore probably performs the duties of an accessory respiratory organ. It has been found that in a perch asphyxiated in stagnant water, the oxygen of the A. has been entirely replaced by nitrogen and carbon dioxide, although the normal proportion of oxygen is from 20 to 25 per cent. In some fishes the pneumatic duct is atrophied, so that the A. becomes a closed sac whose function is entirely hydrostatic, i.e. it serves to keep the sp. gr. of the fish the same as that of the water. The gases in the bladder are compressed or rarefied as the fish is subjected to greater or less pressure by its varying position in relation to the surface, and the quantity of gas is regulated by absorption or secretion, so that the sp. gr. of the whole fish is properly adjusted. In some instances there is a connection between the A. and the auditory organ, probably giving the fish a consciousness of the variations of pressure.

Air-brake, see BRAKES.

Air-chambers, in plants, are cavities in the leaves or stems, or other parts, containing air. They are present in the

parenchymatous tissue at the angles of adjoining cells. They are easily seen in aquatic plants, e.g. water-lilies.

Air Conditioning, system used for controlling the internal climate of a building. This may be necessary for some industrial process (as in cotton mills), for laboratory work, or to maintain comfortable conditions in very hot or cold climates. An extreme instance is afforded by the pressurized cabin of the modern air-liner. Essentially an A. C. system is a forced ventilation system in which, instead of air being drawn in from outside the building, the inside air is recirculated, filtered, washed, heated or cooled, and its humidity adjusted. In cold weather this system results in a considerable economy in heat, especially if the shell of the building is designed to give a high level of insulation; double glazing may be installed, for example, as windows will not need to be opened to admit fresh air. A. C. is widely adopted in Amer. cities. Cooling systems, incorporating refrigeration plant, are much more costly. In the tropics it is feasible to provide them in only the most important buildings. See also VENTILATION.

Air Council, estab. by the Air Force (Constitution) Act, 1917, to administer the R.A.F., to organise the defence of the realm by air, and (initially) to control civil aviation. See AVIATION, CIVIL.

Air-engine, a form of heat-engine in which the working substance is air (see THERMODYNAMICS). A chamber is placed so that one end can be heated by a furnace and the other cooled by a refrigerator. When hot the air is allowed to expand to push a piston; when cooled it is compressed to its original vol. by pushing a piston back. The difference between the work done by the hot air pushing the piston and that done upon the engine by pushing the piston back is the net work done by the engine.

This principle was adopted by the Rev. R. Stirling, who invented in 1816 an A. in which a large plunger works in a cylinder, with a space at the top kept cool by a water-jacket, and a space at the bottom heated by a furnace. The distinctive feature of the engine is the 'regenerator,' a structure of thin metal plates or wire gauze, which connects the cold upper region with the hot lower region, so that the hot air in ascending may give out heat which may be taken in by the cold air in descending, thus supplementing the furnace and economising on fuel. When the plunger is raised the cold air is forced through the regenerator to the bottom of the engine, becoming heated, and exerting pressure which serves to raise a motor piston. The plunger then falls; the heated air is forced up to the cold region, the pressure diminishes, and the motor piston falls. The whole work done by the engine is the difference between the work done by the motor piston and that required to move the plunger. The theoretical efficiency of such an engine is high, but in practice it does not work out so satisfactorily. A double-acting engine of a somewhat

improved type, the result of the collaboration of Robert Stirling with his brother James, was installed in the factory of the Dundee Foundry Co., where it was used for about 3 years; but repeated difficulties connected with the heating vessels eventually caused its abandonment.

In 1853 an American, Capt. John Ericsson, fitted his ship, the *Caloric*, with an A. He used a regenerator, but experienced the same difficulties as his predecessors, and abandoned the attempt after 2 years' trial.

The more marked disadvantages of A.s on the Stirling model are the great bulk of air used in engines of quite small power and the difficulty of transmitting heat to it. The surface to be heated is too large, there is great waste of heat through the chimney, and there is constant oxidation of the metallic envelope, owing to its being at a high temp. in contact with free oxygen.

Modern A.s are usually of small power; they are, however, easy to work, and are especially suitable for pumping. Messrs Hayward and Tyler's 'Ilder' hot-air engine has 2 cylinders and a regenerator consisting of thin iron plates. Coke is employed as fuel, and if the engine is used for pumping the water may be utilised in the cooling-jacket. For a 1-h.p. engine the consumption of coke is about 9 lb. per hr. In the 'Bailey' engine there is 1 cylinder, in which both the motor piston and the plunger work. The engine is very simple in construction, and requires little attention in working. In a Fr. hot-air engine, the 'Bénier,' the air is first compressed by an air-pump and then driven through the incandescent fuel. A valve prevents the escape of the air during the ascent of the piston; it is then exhausted, a portion being blown into a small space surrounding the motor-cylinder, which tends to keep the cylinder and piston cool. This engine is made to give as much as 20 h.p.

Air Force, Royal (R.A.F.). This, the youngest of the 3 services, was constituted by Act of Parliament in 1917 by amalgamating the Royal Naval Air Service and the Royal Flying Corps. These bodies were organised respectively by the Admiralty and the War Office, and rendered effective service during the First World War, but as from 1918 the amalgamated force was organised and controlled by the Air Ministry. The R.A.F. consists of the Royal Air Force, the Air Force Reserve, the Royal Auxiliary Air Force, the Royal Air Force Regiment, the Royal Air Force Volunteer Reserve, the Women's Royal Air Force (W.R.A.F.) (earlier W.A.A.F.), Princess Mary's Royal Air Force Nursing Service, and the Air Training Corps. The Fleet Air Arm was transferred to the R.N. in 1937. The R.A.F. is divided into Commands as follows: Bomber Command (q.v.) (H.Q., High Wycombe); Fighter Command (H.Q., Stanmore); Coastal Command (H.Q., Northwood); Flying Training Command (H.Q., Reading); Technical Training Command (H.Q., Brampton); Maintenance Command (H.Q., Andover); Transport

Command (H.Q., Upavon); Home Command (H.Q., White Waltham); and N. 90 (Signals) Group. *Overseas:* Middle East Air Force (H.Q., Cyprus); H.Q. Brit. Forces, Aden; Air H.Q., Levant; Air H.Q., Malta; Far East Air Force (H.Q., Singapore); Air H.Q., Ceylon; Air H.Q., Hong Kong; 2nd Tactical Air Force, Germany; R.A.F., Gibraltar.

The R.A.F. had its beginnings in the estab. of the Royal Flying Corps on 13 May 1912, comprising naval and military wings, together with a Central Flying School and the Royal Aircraft Factory at Farnborough. In the next 2 years good progress was made and, when war broke out, 4 squadrons of the Royal Flying Corps with some 50 aeroplanes were sent overseas in time to play a part in the battle of Mons; while a detachment of the Royal Naval Air Service (R.N.A.S.) was sent to Belgium and estab. itself at Dunkirk—which remained, throughout the war, a centre of air operations. In Aug. 1914 there were less than 250 officers in the service: in Nov. 1918 there were 30,000. The total aeroplanes available for immediate use in 1914 were about 150; in Nov. 1918 there were more than 22,000. In addition to the W. front, squadrons operated in Italy, Palestine, Salonika, Mesopotamia, and E. Africa. At home an air defence organisation was formed to combat the airship and aeroplane attacks on Great Britain. The R.N.A.S. was primarily engaged in co-operating with the navy in countering the submarine menace to our sea lines of communication. Offensive action was mounted against enemy-occupied ports in Belgium, and naval aircraft from carriers played an important part in the operations against the Dardanelles and in the Mediterranean, the Aegean, and the E. Indies. With the development of the heavy bomber and efficient day bombers in 1917 came the employment of air power in an independent strategic role. In Jan. 1918 the Air Ministry and Air Staff were created for planning and directing such strategic air operations, and 3 months later—on 1 April—the R.A.F. came into being. In June of the same year an independent striking force was estab. in France for an assault on Germany's war industries. When the First World War ended, the R.A.F. was the most powerful in the world; the economies of peace reduced it rapidly to a fifth position amongst the nations.

A scheme for the permanent organisation of the R.A.F. prepared by Lord Trenchard was presented to Parliament by Winston Churchill, then Secretary of State for War and Air, in Dec. 1919. The object of this was to lay a foundation of a small but highly efficient force, capable of expansion without any drastic alteration. A cadet college was opened at Cranwell in 1920, followed in 1922 by an R.A.F. Staff College at Andover. A training scheme for aircraft apprentices was started at Halton. Another development was the formation, in 1925, of the Auxiliary A. F. In the 1920's the R.A.F.

played a leading role in surveying and pioneering air routes throughout the Commonwealth and made many famous flights, the more notable including those from Cairo to the Cape in 1926; a flying-boat cruise of 23,000 m. to the Far E. and Australia early in 1928; and in 1933 a flight from Cranwell to SW. Africa—a distance of 5340 m. in 57 hours. High-speed flying was not neglected and R.A.F. teams won the Schneider Trophy contests in 1927, 1929, and 1931, gaining the trophy outright for Britain and setting up new world speed records in the process. The aircraft used in these contests contributed greatly to the development of later fighter aircraft which won the Battle of Britain in 1940. Simultaneously the R.A.F. was engaged upon active operations. In 1919–20 detachments co-operated with our forces in N. and S. Russia; in 1920 with the Camel Corps in operations against the mullah in Somaliland. The Gov. decided that the control of certain mandated ters. should be taken over by the R.A.F., and in 1922 Sir John Salmond assumed command of the military and air forces in Iraq. For the next 10 years these forces were engaged intermittently in tribal incidents. In India the R.A.F. was involved in numerous actions in Waziristan and during the inter-tribal disorders in Afghanistan. During the rebellion of 1928–9, some 590 people of all nationalities were evacuated by air when the Brit. Legation at Kabul was cut off by rebel forces. In 1928 defence of the Aden Protectorate was also entrusted to the R.A.F. To meet the threat of the new Ger. A. F., the R.A.F. was expanded considerably in the mid 1930's, and by 3 Sept. 1939 its strength stood at 2600 operational aircraft, mostly modern all-metal monoplanes. In addition, it possessed a vitally important reporting system on the ground in the form of the Observer Corps (later Royal), combined with the newly constructed chain of 18 radar warning stations along the E. coast of England, each connected to the filter room at Fighter Command H.Q.

From 2600 operational aircraft and 174,000 officers and men in 1939, the R.A.F. grew to a strength of 9200 first-line aircraft and 1,079,835 R.A.F., Dominion, and allied officers and airmen—of whom some 193,000 were air crew—by May 1945. A major factor in this expansion was the Brit. Commonwealth Air Training Plan, centred in Canada, where no fewer than 360 schools produced, in the course of the war, 137,740 air crew for the R.A.F., the R.C.A.F., and the R.N.Z.A.F. To these were added air crew trained in the U.K., S. Rhodesia, and the U.S.A. Ground personnel, numbering 154,000 in 1935, reached a total of 887,000 by May 1945. Women also served—from a total of 1734 in 1939 the strength of the W.A.A.F. rose to a peak, in 1943, of 182,000 employed in more than 80 trades. The great test of the R.A.F. and its ground reporting organisation came in the Battle of Britain, July–Sept. 1940, when the Germans launched

some 4000 aircraft in attacks on England to pave the way for a planned invasion of Britain. The 600 Hurricanes and Spitfires of Fighter Command inflicted a total defeat upon this force. Their victory marked the turning point in the war and, although Brit. cities had to endure many later night attacks, the crisis had passed. Meanwhile Italy had allied herself with Germany, and the war had spread to the Middle E. Air H.Q., W. Desert, was created on 9 Oct. 1941, under the command of Air Vice-Marshal A. Coningham, from units which had been operating in Egypt and Cyrenaica since the summer of 1940. This force played a leading part in the battles which swayed to and fro across the W. Desert until the decisive battle of El Alamein in Nov. 1942. From then until the final surrender of the Ger. and It. armies in N. Africa in May 1943, the R.A.F. was the spearhead of the advancing Eighth Army, developing techniques of army support that were later adopted by all allied A. F.s. This force was then renamed the Desert A. F. and continued to work with the Eighth Army in the advance through Sicily and Italy.

Throughout the entire war a battle for survival was waged by Coastal Command and light naval forces against the U-boat menace in the Atlantic. With the development of radar search devices, the Leigh light, and the estab. of patrols by very long range aircraft, the counter attack steadily got the upper hand and 303 Ger. and It. U-boats were destroyed by aircraft at sea, 66 in harbour, 17 by air-laid mines, and a further 52 shared between air and surface craft—out of a total of 868 destroyed. In addition 914 enemy surface vessels were sunk by direct air action and another 770 by air-laid mines in N. European waters. In Dec. 1941 Japan joined the Axis powers and war spread immediately to the Far E. After a series of disasters involving the loss of Malaya, Singapore, and Burma, the allied strength was gradually built up until by 1944 it was possible to drive the enemy from Burma in a few months. These operations were made possible by using transport aircraft to supply all the needs of an army of more than 30,000 men. The primary role of the R.A.F. in the Second World War was that for which it was estab. in 1918—the strategic bombing of Germany. Bomber Command began its assault in May 1940 and dropped a total of 90,000 tons of bombs in 1940-2. In 1943 the total rose to 157,000 tons and in 1944 to 525,000 tons. With the development of radio navigational aids, increasing accuracy, and weight-carrying capacity of aircraft, large areas of the Ruhr and other industrial centres were laid waste. This compelled the Ger. A. F. to concentrate on home defence and, coupled with an all-out attack on Ger. fighter production, so reduced its striking power that air supremacy was estab. over N. Europe, and the allied landing in Normandy, in June 1944, was practically unopposed from the air. All commands played a leading role in the liberation of Europe,

and an R.A.F. bomber force was preparing to leave for the Far E. when Japan surrendered.

Post-war, the R.A.F.'s first task was to re-equip Fighter Command with jet-fighters, and it should be recorded that it was the only allied A. F. to use jets in action in the Second World War. Then it built up a large interim bomber force of Canberra jet-bombers whilst developing its formidable 'V' series of four-jet atom-bombers. Transport Command participated in the Berlin air lift of 1948-9. Coastal Command flying-boat squadrons, units of spotter planes and transport aircraft served in the Korean War; and R.A.F. jet-fighters and bombers took part in the Suez operations of 1956. Although much smaller than the Amer. or Soviet A. F.s, the R.A.F. was in 1957 technically and operationally still second to none.

See also AERIAL WARFARE; AEROPLANE; AIR RAIDS; BOMBER; FIGHTER.

Air Gap in a magnetic circuit, the air space between iron cores of adjoining components of the circuit. In electric machines the magnetic circuit consists of field and armature, one of which is rotating, and the A. G. has the effect of increasing the reluctance of the circuit, making the magnetic induction less sensitive to variations in the field excitation, i.e. the machine becomes more 'stiff' as regards regulation. See ELECTRIC MACHINES.

Air-gun, gun in which the bullet is propelled by the energy of compressed air. There are many forms, but usually there is an air reservoir communicating with the barrel, which should be of small bore. The air is compressed by means of a spring, the trigger operates the valve, and the bullet is thereupon propelled by the elasticity of the compressed air. Most A.s are capable of carrying a small bullet for a distance of about 60 to 80 yds. Modern Amer. A.s employ the 'Sparklet' compressed CO₂ as used in soda-water siphons. A.s are limited to .177 and .22 calibre. See also FIREARMS.

Air-lock, chamber connecting the region of compressed air of a caisson (q.v.) with the outer atmosphere. When the outer door is opened to admit men or materials the air is at atmospheric pressure. The outer door is then shut and air pumped into the lock until the pressure is equal to that of the caisson, when the inner door is opened.

Air Mail. A. M. is entirely a post-1918 development, apart from a temporary service between Hendon and Windsor, operated in 1911. A regular service between London and Paris was estab. in Nov. 1919, which was operated by Aircraft Transport and Travel, using an Aircro 'D. H.' type of plane. The initial rate of charge was 2s. 6d. per oz., but this was soon reduced to 2d. In 1920 the service was extended to Brussels and Amsterdam, and 2 years later the Paris service included parcel post. Then followed daily services to Paris, Brussels, Stockholm, and Basel in summer-time. Plans in preparation shortly before the Second World War covered every European cap. in the network of the Brit. A. M. services. A. M.

service between Egypt and Iraq was operated by the R.A.F. in 1921, but in 1927 this service was transferred to Imperial Airways Ltd. In Mar. 1929 the Egypt-Iraq service was included in the newly inaugurated London-Karachi route via Italy, Greece, Egypt, and Iraq. Soon afterwards the Indian service was continued from Karachi to Lahore and also to Bombay and Madras, and then across India via Delhi and Calcutta through Siam to Singapore. In 1933 a further extension was made through Java to Port Darwin (Australia), and thence to Perth, and also a transcontinental service was begun to Sydney and Brisbane. In the following year Imperial Airways announced the preparation of a 7-8-day service to Australia. The other long-distance Empire route, the 8000-m. route from London to Cape Town, was opened in 1932. A transatlantic A. M. service, connecting with the airway system of Canada, and a trans-Pacific service were then projected, and test flights were carried out in 1938 and 1939 between England and Port Botwood (Newfoundland). Between 1936 and the outbreak of war in 1939, Imperial Airways operated the Empire A. M. Scheme with their Short flying-boats, under which all first-class mail to any destination in the Brit. Empire was carried by air at a standard charge of only 1½d. per half-oz. As a result, between 1924 and 1939 the Brit. A. M. increased from 100,000 letters to many millions annually.

There has been no return to the Empire A. M. Scheme since the war; but the great post-war growth of civil aviation has been matched by a steady increase in the vol. of A. M. carried. Brit. airports alone now handle up to 1600 tons of mail each month. See AVIATION, CIVIL.

Information on A. M.s to countries abroad is given in the current A. M. leaflet, which may be obtained gratis at any post office or, by telephone, from the London Postal Inquiry Office.

Air Ministry, ministry formed to administer the R.A.F. (q.v.) through the Air Council (q.v.). It has depts under each of the prin. members of the Air Council. For purposes of recruiting and organisation there were in 1938 5 Area Commands under its control: the Northern, Midland, Southern, Western, and Scottish, with H.Q., respectively, at Catterick, Grantham, Stanmore, Gloucester, and Edinburgh. The enormous increase of the R.A.F. during the Second World War, coupled with the rapid completion of numbers of new aerodromes and the training of thousands of air personnel in Canada under the Air Training Scheme, entirely transformed the organisation of air commands in Britain. The A. M.'s depts include a meteorological office; scientific adviser's dept; directorates of signals, armaments, operations, navigation, accident prevention, intelligence (research, technical, etc.), plans, policy, operational training, equipment, engineering, technical training and radio; and personnel branches.

Air Pollution. Efforts to abate the smoke from the burning of coal date back to 1273, but quite recently other constituents of the general pollution of the air have also been given attention. Considerable research, new legislation, and other action have followed serious 'smog' disasters in the U.S.A. (Donora, 1948) and Britain (London, 1952). The latter led to the appointment of a new committee of inquiry (the Beaver Committee), the report of which in 1954 was followed by the Clean Air Act, 1956, which replaced earlier legislation.

Constituents. The visible constituents of A. P. are smoke, grit, and dust. Smoke is produced by the incomplete and uneconomic combustion of bituminous coal, when some of the volatile hydrocarbons escape unburned. Oil can also produce visible smoke if incompletely burned. In Britain annually about 2 million tons of smoke are emitted, and with accompanying combustible gases there is an ann. waste of up to 10 million tons of coal. Nearly one-half the smoke is from domestic fires. 800,000 tons of grit and dust are also discharged, mainly from industry. Invisible constituents include sulphur gases from the sulphur present in both coal and oil, carbon monoxide and other gases, and from road vehicles an increasing amount of hydrocarbons, aldehydes, and other contaminants. Certain industries also produce specific pollution, such as dust from cement and lime-burning kilns, dust and fumes from metallurgical plant, etc. The notorious 'smog' of Los Angeles, mainly derived from oil products, differs materially from the pollution found in Britain and the eastern U.S. cities.

Effects. A. P. affects health by diminution of natural light (up to one-half winter sunlight may be lost in large cities), by respiration of polluted air, especially when abnormally concentrated by fog, and by the psychological effects of life in a dirty, darkened environment. The London smog (i.e. smoke plus fog) disaster of 1952 caused 4000 deaths, mainly from respiratory and cardiac causes, and in 1956 a less severe episode is estimated to have caused 1000 deaths. Possibly more important is the chronic effect of the normal A. P. on the respiratory system, which will largely account for the excess of bronchitis in urban as compared with rural areas. Serious damage to plant life, stone-work, fabrics, metals, etc., is caused by smoke and the associated sulphur acid gases. Including the fuel losses, the ann. cost of A. P. was estimated by the Beaver Committee to be £300 millions.

Prevention. In principle smoke may be prevented by confining the use of bituminous coal to plant in which combustion can be correctly controlled, and for all other purposes (e.g. open domestic fires) using only the smokeless derivatives of coal. Modern industrial technique, by mechanical and underfeed stoking, good design and instrumentation, skilled attention, avoidance of overloading, etc., can ensure smoke prevention in

most plants. Electricity and gas are increasingly making difficult industrial processes smokeless, as in the Potteries. Grit and dust can be eliminated by electrostatic precipitators, cyclones, wet washing, etc. Elimination of sulphur gases is carried out at Battersea and Bankside power stations, London, but the process is expensive and is not feasible for small plants.

Domestic smoke is now recognised as a very equally serious problem. Efficient new stoves and grates have been developed which will burn any type of smokeless fuel (anthracite, gas and oven coke, and semi-cookes of the 'Coalite' type). Gas, electricity, and central heating are also making important contributions to smokeless housing. New housing estates exist where the use of smokeless methods is a condition of tenancy.

Pollution from road vehicles, and especially from Diesel engines, can be reduced by correct adjustment and maintenance, but cannot yet be satisfactorily prevented. Further research and development are required for this and for a number of other special problems.

Legislation and Control. The Clean Air Act, 1956, provides for strict control over dark smoke from industry, control over new plant, enforcement of measures for the minimisation of dust and grit, and for the progressive abolition of domestic smoke by means of smoke control areas. These are similar to the successful smokeless zones set up in a number of cities, in which all smoke is prohibited. The new Act unifies Eng. and Scottish law, provides for the setting up of an advisory Clean Air Council by the responsible minister, and contains sections relating to smoke from railways, shipping, and Crown premises. Except for the more difficult processes, which are the concern of the central Inspectorate of Alkali, etc., Works, the Act is administered by the local authorities. The programme for smoke abolition proposed by the Beaver Committee is for the setting up of smoke control areas, by stages, in the areas of heaviest pollution (the black areas) over a 10-15 year period. This would remove 80 per cent of the present pollution, but its success depends largely on the increased production of solid smokeless fuels to replace domestic coal.

Organisation. Reference has been made to the legal duties of the Alkali Inspectors and the local authorities. The latter also carry out systematic measurement of pollution under the supervision of the Fuel Research Station of the Dept of Scientific and Industrial Research. The National Smoke Abatement Society (N.S.A.S.) is the prin. information and propaganda body and publisher, with local authority, industrial, and individual membership. See A. Marsh, *Smoke: Problem of Coal and the Atmosphere*, 1947; H.M.S.O., *Report of Committee on Air Pollution*, 1954, and ann. reports on *Investigation of Atmospheric Pollution*; A. R. Meetham, *Atmospheric Pollution*, 1956; N.S.A.S., *Smokeless Air* (quarterly jour.), year-book, and ann. conference

proceedings. There is also a considerable amount of U.S. literature.

Air Pump, machine for diminishing or increasing the amount of air in a contained space. The term was originally applied to contrivances for producing a partial vacuum, but is now used without discrimination in connection with machines for producing a flow of air. The mechanism which provides a diver with a constant supply of air at a pressure proportionate to his depth in the water is called an A. P., and the term is also applied to machinery whose object is to provide a supply of compressed air.

The earliest device for exhausting air by means of a pump is associated with the name of Otto von Guericke. In 1650 he devised an apparatus for removing air from a vessel, called a receiver, which is connected with a barrel in which a piston works. Both the connecting pipe and the piston are fitted with valves opening away from the receiver. As the piston is pushed in, its valve opens and lets out the air contained between it and the valve at the bottom of the barrel. When the piston is withdrawn its own valve shuts, and the other valve opens to allow the air of the receiver to extend into the barrel. The air in the receiver thus becomes more rarefied at each stroke. A. P.s on the Guericke model do not reach a high level of efficiency. The difficulty of working increases as the difference of pressure within and without the receiver increases; there is usually constant leakage at the valves, and when the process of exhaustion has reached a certain point, the pressure of the air left in the receiver is not sufficient to open the valves. An improvement was instituted by Papin and Hawksbee, who used a pump with 2 barrels, thus shortening the process of exhaustion. In Hawksbee's A. P. each piston is worked by a rack and pinion, and owing to the fact that 1 piston works with the pressure of the atmosphere as the other works against it, the difficulty of working as exhaustion proceeds is not increased.

In Tate's A. P. there is a single barrel with a double action, the piston consisting of 2 disks joined together, forming essentially a piston just less than half the length of the cylinder. There is an outward-opening valve at each end of the cylinder, and the inlet is in the middle, so that air is expelled by both the forward and backward strokes of the piston.

A pressure gauge is usually attached to these pumps, consisting of a bent glass tube containing mercury, one end of which is closed, thus forming a kind of barometer. The closed portion, however, need not be 30 in. long, as it is seldom necessary to know the pressure inside the receiver until it is considerably less than that of the atmosphere.

The progress that has been made in modern electrical research and in its practical applications since about 1900 has been made possible only by an enormous improvement in the design and technique of A. P.s. The modern 'high-vacuum' pump is capable of producing a

pressure as low as one million-millionth of an atmosphere. The pressure in a wireless valve and the modern Coolidge X-ray bulb is about one thousand-millionth of an atmosphere. There are 3 main types of vacuum pumps: (1) the rotary oil pump, (2) diffusion pump, (3) the ionisation gauge acting as a pump.

Another type of pump works as follows: Inside a fixed cylinder there is mounted a concentric cylinder of a diameter only slightly less than the outer one. The latter cylinder can be rotated very rapidly about its axis by means of an electric motor. In the outer cylinder there are 2 outlets, one (A) communicating with the vessel to be evacuated, and the other (B) connected to a low-pressure chamber, i.e. one in which the pressure has been reduced to about one-thousandth of an atmosphere by means of an ordinary A. P. The movable cylinder rotates from A to B, and as its periphery is moving with a high velocity, comparable with that of the molecules, a one-way molecular traffic is set up in the direction from A to B, and the pressure in the vessel connected to A decreases very rapidly to a very low value.

In the common filter pump a stream of water rushes past an outlet and draws the air from the tube connected to the funnel containing the liquid to be filtered. The diffusion pump uses the same principle, but with this difference: the stream is a stream of mercury vapour from mercury boiled under reduced pressure, and it rushes past an outlet connected to the vessel to be evacuated, thus dragging molecules of the air along with it. See DIFFUSION PUMP.

Air-raid Precautions (A.R.P.), see CIVIL DEFENCE.

Air Raids. *First World War.* The inviolability of the shores of Great Britain guaranteed by the supremacy of the seas was to a limited extent disturbed in the First World War by enemy attacks from the air. A few attacks were made in 1914. In 1915 Ger. airships of the Zeppelin type raided Norfolk, Northumberland, Essex, Suffolk, Yorks, E. London, and the home cos. The attacks were repeated in 1916 and extended to the midland cos., Cheshire, and as far N. as Scotland. In 1917 and 1918 airship raids were very rare, and ceased altogether after April 1918, the losses sustained by the raiders rendering such mode of attack abortive. Some Ger. airships were brought down in flames in England, and in Oct. 1917 only 4 out of 11 returned safely to Germany, the other 7 being wrecked over France and the Mediterranean. The number of airship raids was approximately 50, and according to the best available estimates the casualties among civilians in killed were: 217 men, 171 women, 110 children; the injured numbered 587, 431, and 218 respectively; 58 sailors and soldiers were killed and 121 injured.

Ger. aeroplane raids began in Dec. 1914, over Dover and other parts of Kent. There were 4 raids over the E. cos. in 1915, 16 over E. and home cos. in 1916,

27 over E. and home cos. and London in 1917, 8 in 1918, mainly over Kent, Essex, and London, the last being in June over Kent. The total casualties from these A. R. were: among civilians, killed 282 men, 195 women, 142 children; injured 741, 585, and 324 respectively; military personnel 238 killed and 400 injured. No co. was more raided than Kent, though Essex suffered severely. No fewer than 213 civilians were killed and 615 injured in 2 raids over Margate, Essex, and London on 13 June and 7 July 1917. By 1918 the R.A.F. had estab. a definite superiority over raiders, and this fact, combined with the pressure on the W. front, which necessitated the retention of Ger. machines over the lines, caused these raids to cease altogether nearly 5 months before the end of hostilities. The last A. R. on London was on 19 May, 1918, this being the twenty-fifth raid on the cap., the prin. damage during the whole period being done in Bethnal Green, Peckham, Lewisham, Lower Sydenham, Kilburn, Hotherlitho, the City, and Poplar. In the City the most disastrous raid was that in which explosive bombs were dropped on the Central Telegraph Office. For the rest anti-aircraft guns and defensive planes kept the raiders too high to permit of damage to railway centres or points of military importance. Many bombs were dropped on Paris in the course of numerous raids, over 400 persons being killed and twice that number injured. In the first months of the First World War, the Allies only employed aircraft for reconnaissance work, for the direction of artillery fire, and for bombing the Zeppelin sheds of Düsseldorf or military positions. The Germans, however, initiated the policy of bombing open or undefended towns with the object of instilling terror into the inhab., but without any marked effect. By way of reprisal the Allies in the later stages of the war effected numerous raids into Germany, especially in the Rhine provs. Later the R.A.F. organised and carried out raids of increasing intensity as far as Frankfurt and Stuttgart, and a great raid on Berlin would have been attempted but for the signing of the armistice.

Air Raids over Britain in Second World War. Daily A. R. on Britain began on 18 June 1940. General night attacks, but on no large scale, were meant to probe defences, and to make pilots familiar with the area. At the beginning of July daylight raids increased in strength, particularly against ports and shipping, suggesting that temporarily the enemy's purpose was not so much the destruction of Brit. air power as the tightening of the blockade, for airports and industrial plants were no longer the main targets. Southampton and Portsmouth were savagely raided, but attacks also ranged from E. Scotland all round the coast to the Bristol Channel. By the end of July the raids were increasing in intensity, but the numbers of hostile aircraft were still comparatively small. On 8 Aug. there was begun a series of mass daylight

raids lasting a fortnight, the number of raiders rising ultimately to more than a thousand. These raids were still directed against ports and shipping, but attempts were also made to wreck airports and destroy defending planes. The battle of Britain (q.v.) showed, however, that the Germans had no hope of conquering the R.A.F. by mass daylight raids. Damage had been fairly extensive in certain localities of London, but basic resources were not seriously impaired. At the end of Aug. it was evident that the Germans

tiers above them, or in mixed formations of fighters and bombers which spread out in the hope of scattering the defending planes before converging from different points and at different altitudes. But they continued to pay a heavy price, and sometimes lost a third of their raiding force. Of the 40 heavier raids by daylight between 5 Sept. and 6 Oct. about a score were directed at the London area. On 15 Sept. the Germans made a supreme effort which proved to be the climax of their daylight raids, and the most triumphant



THE LONDON FIRE RAID OF 29 DEC. 1940

News Chronicle

In the foreground is the spire of St Bride's Church, and in the background the flame-encircled dome of St Paul's Cathedral.

had signally failed to crush the R.A.F. by direct assault on aerodromes and airports. Hence they were driven to indirect methods of attack, which Hitler pretended were in retaliation for the bombing of Berlin. The real motive for the mass assaults on London, which began on 7 Sept., was to paralyse a vital nerve centre by disrupting essential services. In the ensuing weeks London suffered a bombardment from the air more severe than that of Rotterdam or Warsaw. The vast system of the London docks lay almost in ruins. Shops, residences, and utility services were seriously damaged, but the city's vital services continued to function and the morale of the people remained unbroken. The success of the R.A.F. fighter-pilots against the daylight bombers forced the Luftwaffe to change their tactics. The bombers now approached in solid formations with fighter escorts in

day of all for the R.A.F. For losses at this time see P. Fleming, *Invasion 1940*, 1957. The Germans were now constrained to try to achieve their object by night raids, aided by parachute flares and incendiary bombs, and though they found it difficult to locate targets with any precision, their continuous bombing by mass assault wrought great havoc, especially in areas round the E. End docks. The defence now concentrated on a box barrage, aided by new methods of prediction and new combinations of searchlights and anti-aircraft fire. It still remained, however, to train fighter-pilots for night operations. But all these defences were still far short of giving immunity against the damaging effects of a protracted process of attrition. None the less the abandonment of *blitzkrieg* methods of air-raiding meant that all hope of an immediate victory over

Britain had gone, and the enemy now hoped by indiscriminate night-bombing to demoralise the civilian pop., besides progressively destroying London or paralysing its commercial life. Occasionally they still sent over daylight raiders, but when they did so their losses always rose, and sometimes they tried daylight raids by fighter-bombers under cloud cover—'nuisance' raids, whose purpose was to increase the strain both on civilian morale and on the fighter-pilots of the R.A.F.

But if the damage to vital objectives was still a matter of chance the damage to London property generally was mounting in severity and extent. In Oct. London was still the main objective, but by the middle of that month there were scattered raids on prov. cities which sometimes bore the brunt of an attack. The failure to conquer England by destroying London had compelled the enemy to turn his attention to the chief industrial areas, while periodically claiming that the raids were reprisals for R.A.F. raids. A full-scale attack on Britain being impracticable the Luftwaffe now tried the method of concentrating the maximum force on a single point of attack. Coventry was the victim of the first of these attacks. Some 500 planes bombed that city throughout the night of 14 Nov. with indiscriminate attacks, which destroyed the cathedral and the centre of the city, but left industrial plant relatively untouched. This 'terror' raid was soon followed by similar attacks on other tns, though not on the same scale. Birmingham, Southampton, Bristol, Liverpool, Plymouth, and other tns were in turn the objectives of such concentrated raids sev. times. Sheffield experienced the first of a series of raids on 12 Dec. Manchester was raided on 22 Dec. But public morale was not shaken, and on 29 Dec. the Gers. turned from high explosives to incendiarism. On that night thousands of incendiary bombs on the very heart of the City of London found its defenders unprepared, and many famous buildings were destroyed, the disaster being paralleled only by the Great Fire of 1666. It was, however, significant that the raids were now always on a limited scale, the inference being that the enemy was still unwilling to use more than a fraction of his force. Severe as the raids were, the real test in the air lay in the future. The direct damage by A. R. to Britain was not so much a matter of spectacular destruction as of gradual attrition, and perhaps the most extensive damage to an important area in this sense was that done in the Sept. raids on the E. End of London when great quantities of food imports were destroyed. But the percentage of destruction of industrial plants remained small, and not one of the services upon which the life of the great cities depended had broken down entirely. The 'nuisance' raids of Oct. were probably intended to retard production by compelling workers to resort to their shelters, though this was offset to some extent by employing roof-sitters. But

inevitably there was some loss of efficiency through the disturbances in the normal routine of civil life. The demolition of dwellings, particularly in Coventry, Plymouth, and the riverside bors. of E. London, also involved considerable inconvenience, especially as there was already a housing shortage. It was, therefore, true enough to say that the civilian, and particularly the London civilian, was in the front line. Air-raid wardens and the national fire-fighting services were repeatedly occupied in tasks of the most extreme danger, while the bulk of the pop. was exposed to perils which in past wars were experienced only by the people whose land was actually suffering invasion. But the prospect of A. R. was foreseen by the Gov. before the war began. Besides air-raid precautions and an auxiliary fire service, adequate preparations were made for the care of raid casualties. Yet insufficient preparation was made for the contingency of homeless persons. Thus, in Poplar, where more than half the houses were hit, the rest centres could not shelter, clothe, or feed the 'bombed out'; and no efficient billeting organisation existed, while responsibility for various functions was distributed among many different local bodies. But at this time the chief problem was the provision of sufficient shelters, for which no real plans had been made either by the Gov. or by the local authorities. With the accommodation in the few deep public shelters utterly inadequate, Londoners crowded into the tube stations to sleep in bunks on the platforms or on the stairs, while others sought refuge in warehouse basements. In these conditions the menace of disease was serious, especially as most shelters contained no heating installations. Some amelioration came with the provision of 'Anderson' shelters, and later of 'Morrison' indoor shelters; but Mr Herbert Morrison (q.v.) continued generally to rely on dispersal through a combination of evacuation to safer dists. and surface shelters, and this, in the circumstances, was no doubt the most effective remedy. Throughout these months of the greatest strain the patience of the mass of the pop. was beyond praise, and indeed the spirit of the Brit. people remained prepared to endure whatever burdens the war might inflict, confident always in ultimate victory.

There was a lull in A. R. over Britain for some 6 weeks between Jan. and the beginning of Mar. (1941) owing to the fact that Ger. air activity was now subordinate to the U-boat warfare. In this connection large-scale A. R. were resumed, in Mar. 1941, against the areas of Brit. ports in the hope of dislocating their functions as such. This time the long-range Ger. bombers struck as far N. as Glasgow and the Clyde-side, where the mass technique tried out at Coventry was combined with that of the incendiary attack on London. The effect of these raids was to some extent diminished by the fact that fire-watching had been made a compulsory duty, and that the

night-fighter defence and anti-aircraft technique had both been much improved. Considerable damage was, however, done to Plymouth, Southampton, Bristol, Cardiff, and Swansea, though none of these cities suffered the prolonged ordeal of London during the autumn of 1940, and in any case the Luftwaffe still lacked the resources to strike more than one major blow in a single night or on 2 successive nights. From April to June 1941 the Luftwaffe persistently attacked the chief seaports on the W. coast through which Amer. supplies must come, and sometimes they bombed E. coast tns, notably Newcastle and Hull. Some of the ports were heavily damaged, and made practically uninhabitable, though none was knocked out completely. The 3-day raiding of Plymouth on 21-3 April sent a great number of the inhab. out into the open countryside, and after sev. more raids before the end of April the state of Plymouth was even worse than that of Coventry. Portsmouth suffered a similar though less severe experience. Bristol's worst raid was on 11 April. Belfast was twice heavily raided in the same month. Liverpool was raided on 2 May, and for a week thereafter; yet despite widespread damage the port did not cease to function. The inland industrial cities were also intermittently attacked: Coventry again on 8 April, Birmingham on the succeeding night. London had one of its most savage attacks of all on 16 April, a dusk-to-dawn visitation which was only exceeded in ferocity by the raid on the night of 10 May when the roof of the House of Commons was demolished. Manchester and the Midlands suffered sporadic raids in June. But by way of set-off the improvement made in radio detection (see RADAR) soon made itself felt in an increasing number of enemy raiders being brought down by the Brit. night-fighters, especially on moonlit nights, and on 10 May the Germans lost 33 machines; while for the whole of May no fewer than 143 night-bombers were shot down, a substantial advance on any previous figures for night-time.

The extent and fierceness of this raid on London, following on the prolonged attack on Liverpool, and the increasing activity over the rest of the country, seemed to presage a full-scale Ger. air offensive by way of preliminary to an invasion, and the widespread attacks on Brit. air bases on 11 May seemed to confirm this impression; but in fact these raids were quickly followed by a lull—the lull before the Ger. invasion of Russia—though occasional savage raids were still made, and the 'hit-and-run' raids were continued. But generally speaking the practical cessation of Ger. A. R. over Britain was the corollary to the concentration of Ger. air-power on the Russian front, and the battered industrial cities and ports of Britain now enjoyed a valuable respite in which to remove the debris and return to an approximation of normal activity. Moreover it was now the turn of the Ger. cities to experience the nature of an all-out air attack, for

more bombs were dropped by the R.A.F. on Germany in June 1941 than had been dropped on Britain in April, the peak month of the Luftwaffe's effort, and the ensuing months showed that the Brit. attacks were on an ever mounting scale. Britain, in fact, had now secured relative immunity from large-scale A. R. There was a recrudescence on a minor scale in April 1942, the so-called 'Baedeker' raids on Brit. cathedral cities, such as York, Bath, Canterbury, and Exeter, alleged to be retaliatory raids for the bombing of Cologne, Rostock, and Lübeck. These 'Baedeker' raids involved over 900 civilian deaths against only 20 in the previous month, but comparison with the figure of 6000 fatalities in April 1941 shows how steeply the scale of Ger. A. R. had declined, and mostly less than 30 machines took part in these attacks. Enemy A. R. against Britain in 1943, described not inaptly as 'scalded cat' raids, were mostly carried out against fringe targets, and on no occasion were they on a heavy scale. On a number of occasions fast fighter-bombers were used, doubtless to keep down losses. There was little activity by day and most of the night raids were scattered.

A few days after the allied invasion of Normandy began (June 1944) the Germans opened an attack against London and S.E. England with jet-propelled flying bombs (V1). The attack was not on the scale the enemy had hoped because the launching ramps in the Pas-de-Calais and elsewhere and storage depots in France were subjected to persistent poundings from the air. When it was no longer possible to launch them from the ground the Germans used obsolescent bombers to release them while flying low over the North Sea. Later the V1 attacks, as they were called (see FLYING BOMB), were reinforced by rocket attacks (V2), mainly from Dutch bases. As these missiles (see ROCKET) are invulnerable during flight, the allied air forces, whenever possible, attacked them while they were in transit from the underground factories within the Reich to their launching sites. A great deal of damage was done by the flying bombs during an intensive period of some 80 days in June-Aug. 1944. Croydon was very heavily attacked, 3 out of every 4 houses being more or less damaged, and some 211 persons were killed—a low death roll owing to evacuation and good shelter accommodation. The 13 worst-hit bors. (in order of severity) were in the S.E.: Croydon, Wandsworth, Lewisham, Camberwell, Woolwich, Greenwich, Beckenham, Lambeth, Orpington, Coulsdon and Purley, West Ham, Chislehurst, and Mitcham. Wandsworth was only a degree less badly damaged than was Croydon. The old parish church of St Leonard's, Hastings, was completely demolished. The V2 rocket attacks began in the early autumn of 1944, and continued intermittently until stopped by the Canadian liberation of Holland. S. dists, especially suffered from this long-distance bombardment, by both V1 and

V2 attacks, which ceased on 27 Mar. 1945, when the 1505th and last rocket landed in Orpington. Throughout this period flying bombs, but in no great numbers, continued to come over. One of the worst incidents of the war was caused by a rocket which fell on Smithfield market buildings in Mar., killing 115 persons, and seriously injuring 122, while another rocket at Stepney in the last few days of the attacks killed 131 and injured 40. It is conceivable that the Germans, who were experimenting in Norway with 'heavy water,' might have developed attacks on Britain with atomic bombs, but they were utterly defeated before they could conclude their experiments. The total number of civilian casualties in the U.K. through enemy A. R. from the outbreak of war was 146,760. Of these 60,585 were killed and 86,175 injured and detained in hospital. The detailed figures were as follows: Killed (or missing, believed killed), men, 26,920; women, 25,392; children under 16, 7736; unclassified, 537. Injured and detained in hospital: men, 40,736; women, 37,816; children under 16, 7623. *See also under the names of individual cities.*

Chief Allied Raids on Germany, 1943-1944 (the 1940-2 bombing of Ger. tns is dealt with under **AERIAL WARFARE**, when policy was in the making and allied A. R. were not on a very large scale). Berlin was bombed 4 times by the R.A.F. in Jan. 1943—twice in daylight by Mosquito bombers. Heavy bombers of the R.A.F.—Lancasters, Halifaxes, and Stirlings—dropped 4000- and 8000-lb bombs or 'block-busters' (q.v.) on Berlin on 3 Mar. Munich was hit with 500 tons from R.A.F. bombers, 11 Mar. On 17 May daring low-level attacks were made by Lancasters on the Eder and Möhne dams in the Ruhr: the walls of the dams were blasted with 1500-lb. mines and great damage was done by flood waters down the Ruhr valley. A heavy blow to Ger. war industry was dealt by the R.A.F. raid, 11 June, on Düsseldorf, the administrative cap. of the Ruhr and notable for its iron and steel, heavy engineering, and armaments plants. Münster was also bombed almost simultaneously. Transcending all these raids was the raiding of Hamburg, which might well be named the battle of Hamburg. Probably the dominant motive for the tremendous destruction wrought there was to paralyse the submarine-building industry—a paramount consideration for the W. Allies. In the great raids between 24 July and 3 Aug., 9 sq. m. of Hamburg were utterly devastated, and more than 77 per cent of the city's 15 sq. m. of fully built-up areas wiped out. Eight shipbuilding yards were either destroyed or severely damaged; oil, non-ferrous metal, and chemical works were destroyed; most of the city's centre was demolished; and vast damage done in the dock areas. The total Brit. losses were 87 bombers, averaging no more than 14 a raid. On 4 Nov., by daylight, Amer. Flying Fortresses bombed Wilhelmshaven—also a submarine centre; while the R.A.F. made a night raid on

Düsseldorf. The Flying Fortresses did not always escape punishment. While on 7 Nov., in their attack on the non-ferrous metal centre, Düren, 25 m. S.E. of Cologne, accompanied by a Thunderbolt fighter escort, they lost no machines. In an earlier raid, on the ball-bearing plant of Schweinfurt, they lost no fewer than 60 aircraft; but they were then without long-distance fighter escort. Berlin was again bombed by the R.A.F. on the night of 26 Nov., while, in the day, a great force of Amer. heavy bombers attacked Bremen. The range of the heavy bombers was now being extended—thus on 3 Dec. the R.A.F. dropped 1500 tons on Leipzig. The year closed with more attacks on Berlin by the R.A.F., and these were continued in the early months of 1944.

Raids on Berlin. It may be said that the real air battle of Berlin began on 18 Nov. 1943, and there were 6 major attacks between that date and the end of 1943. The chief destruction was in the W. and central parts, including the Tiergarten and Charlottenburg dists. A number of factories in the Reinickendorf dist. and the Siemensstadt, together with administrative buildings in the Wilhelmstrasse, were either destroyed or greatly damaged. There were 9 more major raids in the air battle of Berlin up to 15 Feb. (1944), the culminating raid of 15 Feb. being carried out by 1000 bombers, chiefly Halifaxes and Lancasters, 2500 tons being dropped in half an hour for the loss of 43 machines. The damage by this date was officially estimated at 326 major war plants, 775 out of 1500 smaller plants, 7 gas works, 3 power stations, and the main offices of 21 gov. depts. Organised industrial activity virtually ceased in Berlin at the end of Nov. (1943), and had not been resumed late in Jan. 1944. But the 15 raids cost the R.A.F. 465 bombers and 3000 men. On 6 Mar. strong Amer. forces, escorted by long-distance fighters, attacked Berlin by daylight, this being the first heavy attack by the U.S. Strategic Force on the Ger. cap. They lost 68 bombers and 11 fighters, but themselves destroyed 120 Ger. aircraft. The U.S. Strategic Force made another attack on 8 Mar., losing 38 bombers and 16 fighters. Yet despite its continuous battering, the Allies considered that Berlin stillon tained much of military and industrial importance, and on 24 Mar. one of the heaviest attacks theretofore was made by the R.A.F., when 2500 tons were dropped. The Luftwaffe offered a spirited defence and the R.A.F. lost 73 aircraft. The effectiveness of allied bombing was much increased by its continuity—Amer. day raids followed or preceded by Brit. night raids either on the same target or on others in the Reich.

Wilhelmshaven, Leipzig, Brunswick, Stuttgart, Gotha, Frankfurt, and Osnabrücken attacked. Some 1100 Amer. bombers made a great attack on 3 Feb. on the port and naval base of Wilhelmshaven, the Flying Fortresses being escorted by fighters—Thunderbolts, Lightnings, and

Mustangs. The greatest daylight assault of the war up to that date took place on 20 Feb. when 2000 allied aircraft, including a large force of Amer. heavy bombers, following a night attack on Leipzig by 1000 Brit. bombers, also bombed Leipzig, together with many other targets, including Gotha, Bernberg, Brunswick, and Oschersleben. Stuttgart was also a much-sought target, on account of its aircraft factories and repair depots. There was a double attack on 22 Feb. by the R.A.F., who dropped 2000 tons at night, and by the Americans in a day attack with nearly 2000 aircraft; and another attack on 15 Mar., when the R.A.F. dropped 3000 tons, this being the city's sixth battering by the R.A.F. The mounting scale of Amer. attack is shown by the fact that between 20 Feb. and 9 Mar. (1944) the Amer. heavy bombers dropped 17,000 tons of bombs on Ger. plants and, together with Amer. fighters, destroyed 1023 Ger. planes in combat. Frankfurt was assaulted by over 2500 R.A.F. bombers on the night of 18 Mar., only a few hours after 1500 Amer. fighters and heavy bombers had returned from day attacks on industrial and other targets in S. Germany—aircraft factories and other war plants in Augsburg, Landsberg, and elsewhere. Frankfurt was an important war-production city and rail centre, and Amer. heavy bombers and the R.A.F. attacked it twice again in the same month. Brunswick, too, was subjected to many and severe attacks in the early months of 1944. Essen, which had been so severely hit in the battle of the Ruhr in 1943 and had not been raided for a year, was dealt its heaviest blow of the war by the R.A.F. on 26 Mar., the assumption being that much of the war plant had been since restored.

On 30 Mar. the R.A.F. suffered their heaviest loss—94 aircraft of a total force of nearly 1000 which attacked Germany, with Nuremberg as the main target—not a small price to pay even for a successful attack on an important war-production centre. The Luftwaffe, however, sent up the greater part of their entire night-fighter force to defend Nuremberg, and probably day-fighters as well, and the attackers were opposed by hundreds of twin-engined and single-engined fighters, as many as those encountered by the U.S. Air Force in their great daylight raids.

The first time that more than 1000 heavy bombers attacked Berlin was during the night of 21 Mar. 1944, when Lancasters and Halifaxes dropped more than 2500 tons of bombs; but on 21 June more than 1000 Flying Fortresses and Liberators, accompanied by 1200 Lightnings, Thunderbolts, and Mustangs, attacked targets in Berlin and at Basdorf on the outskirts of the cap.—the targets being K.W. 190 engine factories at Basdorf, and railway yards and factories in Berlin. This was the largest force of aircraft ever sent against Berlin targets: 43 bombers and 7 fighters were lost, but the enemy lost at least 50 planes. The appearance of Thunderbolt fighters over Berlin for

the first time showed that heavy Amer. fighters then had a sufficient range to enable them to do a 1200-m. round journey. On 12 May (1944) over 750 Amer. heavy bombers hit 4 synthetic oil plants near Leipzig and one in Czechoslovakia, this being the deepest penetration by U.S. bombers from Brit. bases. Fierce resistance was met, 150 Ger. aircraft being shot down for the loss of 42 Amer. bombers and 10 fighters.

But in the tremendous pounding of Germany's industrial areas by Anglo-Amer. heavy bombers, records were often established only to be broken again soon after, and in daylight on 16 Nov. 1944 R.A.F. bombers, operating in support of the Amer. armies, dropped the greatest load of bombs of all time—more than 5600 tons—to obliterate the Ger. centres of Dürren, Jülich, and Heinsberg. The heavy bombers' main targets towards the end of the year (1944) were railway marshalling yards and oil plants, particularly the great synthetic plant at Leuna. Early in 1945 the allied strategic bombers had matters all their own way over Germany. Their numbers were enormous, whether by day or night; thanks to radar (q.v.) they could hit targets which they could not see, and by means of a Brit. invention for dispersing fog they could go up and come down in almost any weather. By Mar. the R.A.F. were using bombs up to 10 tons in weight, the first of these being dropped in NW. Germany on 14 Mar. on a viaduct. 18 Mar. saw the biggest daylight air attack on Berlin when 1300 Liberators and Flying Fortresses sent down 30-ton salvos of bombs every 30 seconds on railway yards near the centre of the city, and vast armament plants in the industrial suburbs. The greatest previous raid on Berlin by daylight was that on 26 Feb. (1945) when 1200 aircraft took part. But by this time the allied bombers had more or less razed most of the larger Ger. cities, and although the Germans had planned a great fleet of fighter planes for defence, including very fast types using jet propulsion, the bombing nipped most of it in the bud, and left few defences against A. R. save flak. It may be noted here that in Feb. 1945 a tremendous air assault was opened against Ger. communications with Italy in preparation for the final land offensive which the Allies launched on 8 April. For air raids against Japan see PACIFIC CAMPAIGNS. See also AERIAL WARFARE and UNITED STATES AIR FORCE.

Air Records, see AERONAUTICS; ATLANTIC FLIGHTS; SCHNEIDER TROPHY.

Air-sacs, bladder-like chambers communicating with the lungs in birds. They are situated all over the body and make the aeration of the blood much more complete than in other vertebrates. In most cases they communicate with spaces in the bones, rendering them pneumatic, thus serving to lower the sp. gr. of the bird. A. are also found in the chameleon. These also are a complication of the lungs, and can be inflated, increasing the bulk of the animal.

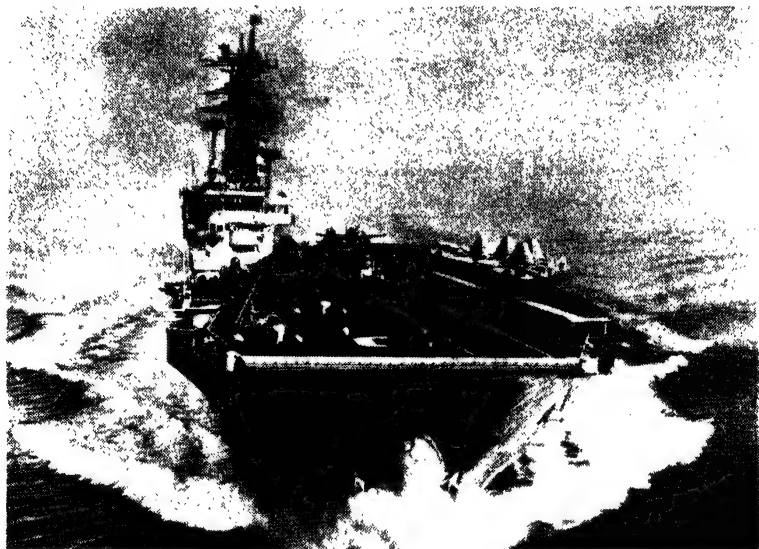
Air Survey, see MAPS.

Air Transport, see AEROPLANE; AIR MAIL; AVIATION, CIVIL.

Air-valve, an arrangement to prevent the compression of air where there is a bend in line of water-pipes. When the pipes are filling with water the driving of the air to the upper part of the bend might cause sufficient compression to stop the flow if it were not allowed to escape. The valve is closed by a guided float if the water itself reaches to the top of the bend.

engages one of the arrester wires on the flight deck. The aircraft is thereby brought to a halt. Battleships and cruisers used to be equipped with a catapult for launching seaplanes used for reconnaissance, but this practice was dropped towards the end of the Second World War when sufficient A. C.s became available. The seaplanes landed on the water and were recovered by the ship's crane.

At the beginning of the Second World War in 1939 the Brit. Empire had 8 A. C.s



C.O.I. Crown Copyright Reserved

H.M.S. 'ARK ROYAL' IN THE MEDITERRANEAN

Jet aircraft being spotted ready for launching by catapult.

Air-vessel, chamber interposed between the pump and delivery pipes in single-acting pumps. The air in the chamber is compressed at each forward stroke of the pump, thus providing a pressure which serves to drive the water on during the backward stroke. As the water tends to absorb the air, the latter must be replenished from time to time.

Air Warfare, see AERIAL WARFARE.

Aircraft Carrier, large naval vessel designed to carry aircraft and provide facilities for air operations while at sea. The aircraft fly off from and land on the flight deck, which is a large expanse of open deck, occupying the whole of the length of the ship and most of the width. The ship's superstructure is on the starboard side of the flight deck. Aircraft are frequently launched from the carrier by catapult. When landing the pilot lowers a hook fitted in the fuselage, which

of a total displacement of 126,000 tons and 7 'building and authorised' of a total displacement of 138,000 tons. The totals for other powers were: France, 2 with a displacement of 32,000 tons and 2 under construction of 36,000 tons' total displacement; Germany, 2 under construction (39,000 tons' total displacement); Japan, 11 (147,000 tons) and 2 (25,000 tons); Russia, 1 (9000 tons) and 2 (24,000 tons); and U.S.A., 5 (120,000 tons) and 2 (35,000 tons). The famous *Ark Royal* was a vessel of 23,000 tons with 16 4.5-in. guns. She was torpedoed and sunk in the Mediterranean E. of Gibraltar in 1941 (see *ARK ROYAL*). The *Courageous* (22,500 tons) and the sister ship *Glorious* carried 16 4.7-in. guns. The *Courageous* was originally completed as a cruiser in 1917 but was converted between 1924 and 1928 and refitted in 1936. She also was torpedoed

and sunk, 17 Sept. 1939, 515 men being lost. The *Glorious* was sunk off Norway in June 1940. Other A. C.s are (1942) the *Hermes* (10,850 tons, 6 5.5-in. guns), sunk by the Japanese off Ceylon in April 1942; *Furious* (22,450 tons with 10 5.5-in. guns); *Eagle* (22,600 tons, 9 6-in. and 4 4-in. guns); and the *Argus*, a training A. C. of 14,450 tons with 4 3-pounders. The Brit. A. C. *Illustrious* (23,000 tons), completed after the outbreak of war, rendered great service on 11 Nov. 1940 at the victory of Taranto, which restored naval supremacy in the Mediterranean to the Brit. Fleet, for the striking forces were naval aircraft flown from the carrier. On 10 Jan. 1941 the *Illustrious*, while conveying ships to Greece, was heavily attacked in the central Mediterranean by 15 Junkers dive-bombers, and hit with a 1000-lb. bomb below the bridge, but, though shaken from stem to stern, she reached port safely. In the Guadalcanal campaign (Aug. 1942), the crucial campaign of the Pacific in the war against Japan, 3 A. C.s formed part of the 'task force' (independent tactical unit) which covered the Amer. landings, but were withdrawn as soon as possible owing to fear of a Jap. land-based air attack. There were, however, A. C. engagements off the E. Solomons (23-5 Aug.) and the Santa Cruz Is. (26 Oct.), in the latter of which the *Hornet* was sunk, leaving the damaged *Enterprise* the only allied A. C. in the Pacific, the *Wasp* having been sunk by submarine in Sept. But by Feb. 1943 the U.S.A. sent 5 more A. C.s to the Pacific. After the lessons of Guadalcanal the attrition tactics were replaced by the adoption of the principle of achieving decided command of the sea by building up much larger task forces, and in this strategy the A. C. played its part. Until the series of operations which began at Tarawa the A. C. had been used in small numbers, and regarded merely as a means of making planes available to surface ships as a protection for them when beyond easy reach of their own land-based aircraft. But the offensive successes of the Amer. A. C.s in Feb.-Mar. 1942, at the Marshalls, Rabaul, Wake, Lae, and Salamana, showed the Amer. Naval Command what were the real potentialities of the carrier, and the result was an accelerated and expanded programme which bore fruit towards the end of 1943. For once the Americans began to use carriers in large groups it became evident that their navy had incorporated within itself the only truly mobile air force of any size in the world, an air force in which both the aircraft and their floating bases were capable of rapid movement and of achieving surprise; while Amer. naval fighter-planes operating from A. C.s proved tactically superior to the best land-based planes which the Japanese could send against them. The popular doctrine that carrier-borne air forces should not be opposed to land-based air forces because the floating base could be sunk was largely overcome by the very fact of concentration, which gave the Amer. task fleets air forces large enough to repel

dangerous concentrations of enemy planes in the Okinawa campaign over a 2-month period 8 large carriers, 2 light carriers, and 3 escort carriers were damaged, most of them by the Jap. *kamikaze* (suicide planes), a salutary reminder to the Amer. Navy that tactical problems are never solved conclusively.

Since the Second World War, A. C.s have replaced battleships as the main naval fighting ships, and they have been developed to operate the fast, heavy jet aircraft of to-day. Recent improvements include the angled deck and the deck-landing mirror aid, which has replaced the 'batman.' Both inventions are Brit., and have reduced deck-landing accidents by over 50 per cent. Britain has built 5 A. C.s since Jan. 1950: *Eagle* and *Ark Royal* (36,800 tons), and *Albion*, *Centaur*, and *Bulwark* (22,000 tons). Six older Light Fleet carriers are used for non-flying training or are in reserve, but all R.N. A. C.s, which saw much service in the Second World War, have been scrapped, except the *Victorious*, which is being extensively refitted. In Jan. 1957 the Royal Canadian Navy had one A. C., the Royal Australian Navy 2, while it was recently announced that India had decided to buy a carrier from Great Britain. The U.S. Navy had 15 'attack' carriers, including 2 of the *Forrestal* Class (60,000 tons), the largest A. C.s in the world. France had 3 A. C.s and was building 2. The U.S.S.R. was the only major naval power with no A. C.s. See also AIRFIELD.

Aird, Thomas (1802-76), poet, b. Bowden, Roxburghshire, and educ. at Edinburgh Univ., was the friend of Carlyle and Hogg. His literary work, though praised by Carlyle, has never become popular. The best-known piece in his *Poems*, 1848, is 'The Devil's Dream.'

Airdrie, burgh of Lanarkshire, Scotland, 11 m. E. of Glasgow. Originally a centre of cotton weaving, A. now manufs. a large number of products ranging from paper to patent medicines. Pop. 30,660.

Aire, riv. of England, rising in the Pennine Hills in Lancs, but early in its course passing through the A. Gap into Yorks. It runs through the S. part of the co. to join the Ouse near Goole. Length 70 m. Airedale, through which it flows, is a picturesque valley lying between Malham Cove and Leeds. The A. and Calder Navigation is a system of rivs. and canals serving the larger Yorks towns. Its chief branches are from Goole to Leeds and from Castleford to Wakefield.

Aire-sur-Lys, Fr. tn in the dept of Pas-de-Calais, at the junction of 3 canals with the R. Lys. There are some fine old houses. The tn has a trade in agric. produce. Pop. 8200.

Aireborough, urb. dist. of the W. Riding of Yorks, England, 5 m. NE. of Bradford. Within the dist. is Yeadon Airport. Woollen milling is carried on. Pop. 27,570.

Airedale, breed of large, rough-haired terriers forming the link with the hound group, and said to be a hybrid between

the otterhound and the Welsh terrier or a local terrier of the Aire valley. It is the largest of the terriers and was first bred in 1853. It has a close, wiry coat of black and tan, short straight back and sloping shoulders, flat skull, forelegs



AIREDALE

T. Full

perfectly straight, and powerful jaws. A full-grown dog should weigh about 15 lb. It needs much open-air exercise on account of its strength and size, and is not suited for life in small houses in towns.

Airfield, alternatively **Aerodrome**, or, if supplied with customs and immigration facilities, **Airport**, a place at which aircraft land and take off. A.s vary in type from flat grass-covered surfaces allowing take-off runs of 600 yds or less to great open spaces crossed by concrete runways up to 5000 yds in length and 150 yds in width and surrounded by concrete tracks for taxi-ing. Most A.s have hangars for housing aircraft. Bigger types have buildings to house control organisation, administrative services, workshops, and offices of operating companies. Chief A. in London area is London Airport, between Hounslow and Staines. The layout finally chosen for this has 3 pairs of parallel runways, arranged in the form of 2 interlocking triangles, 2 of the runways being 3000 yds long, and the others 2000-2500 yds. These now allow 50 or more aircraft to be handled per hour in daylight. London is to have a secondary airport at Gatwick in Surrey, which will probably be used mainly for short-range services. Second inter-continental airport in Britain is at Prestwick, near Ayr, Scotland. There are some 160 A.s available to civil aircraft in the U.K.; many of these are owned and operated by the Ministry of Transport and Civil Aviation. Landing charges are made at every A. and are graduated according to loaded weight of aeroplane. Many smaller A.s have club-houses; bigger A.s have public waiting-rooms and refreshment-rooms for passengers and also public enclosures for spectators. Control organisation is responsible for regulating air traffic within the airport control zone. It is also responsible for

providing runway, boundary, and taxi-track lights, and for aids to landing in poor visibility. These include radio and radar beacons which indicate on instruments in the aircraft the approach path an aeroplane must follow to arrive at the end of the runway. Alternative system allows track of incoming aeroplane to be followed by radar and approach instructions to be given by radio to pilot. Control also instructs pilots what heights and courses to fly within control zone. Major A.s provide pilots with bearings, 'fixes,' and special meteorological information on request (see **AERIAL NAVIGATION**). One civil and 1 R.A.F. A. in Britain have fog dispersal apparatus installed on each side of 1 runway for use in emergency. Every A. in commercial use has a neon beacon which flashes the 2-letter call-sign of the A. at night. Most A.s are some miles from the cities they serve, and only 1 in the U.K. (Gatwick) has its own railway station. Communication is generally by road.

Aircraft carriers (q.v.) are floating A.s for aeroplanes and are important units of most of the navies of the world. They have a speed of over 30 knots and flying decks up to 1036 ft in length. Machines are transferred very speedily to the deck from the hangars below by hydraulic lifts. Catapults are provided to assist the aircraft into the air, and a system of wires across the deck is used to engage a hook carried by the aircraft, to bring it to a halt when it lands.

Airships, too, have acted as aerial A.s, and the ill-fated Amer. dirigible *Akron* was large enough to house 5 aeroplanes in a special compartment. The aeroplanes, suspended from trapezes, were lowered, detached themselves, and flew off, and at the end of their flight could attach themselves to the trapeze and be hoisted aboard the airship again.

The name aerodrome was also given by Prof. Samuel Pierpont Langley (q.v.) to his steam-powered tandem wing model aeroplanes, and to the full-sized petrol-engined version of 1903.

Airola, vil. of Switzerland, canton of Ticino, at the S. end of the St Gotthard railway tunnel. Elevation 3800 ft. A bloody battle was fought here between the French and the Russians in 1799. The vil. was twice almost destroyed by avalanches, in Dec. 1898 and Jan. 1951. Pop. 1700.

Airport, see **AIRFIELD**.

Airship, popular name for a lighter than air dirigible aircraft using either hydrogen, coal-gas, or helium as a lifting agent. As soon as balloons were invented in 1783 efforts were made to steer them, and it was quickly seen (a) that the envelope must be elongated and (b) that an engine working a propeller must be employed. Despite the brilliant but unrealisable designs of Mennier (1781), and ineffectual efforts to make balloons dirigible, the first successful A. was made by the Frenchman H. Giffard (1852), which was steam-powered; but it could only travel at about 5 m.p.h. In 1884 two

other Frenchmen, Renard and Krebs, made their *La France*, which was the first practical A. of hist.: it was electrically powered. After a further period of only mild activity A.s became increasingly popular. The practical light A. was pioneered by Santos-Dumont, 1898-1906, and the first Zeppelin flew in 1900. It was Zeppelins which between 1910 and 1914 pioneered air passenger travel on a large scale, and carried nearly 35,000 passengers, without a fatality, over some 170,000 m.

The major nations were producing numerous A.s of various types and sizes before the First World War, but Great Britain and the U.S.A. had done little compared with France, whose *Lebandy* was particularly successful, and Germany. In England a few non-rigid A.s had been constructed, such as *Nulli Secundus*, *Beta*, *Gamma*, until Gor. Progress alarmed the Brit. Gov., and the ill-fated *Maffly* was built. This was Britain's first rigid A., but it met with disaster on its trial flight. When the First World War broke out Germany was well in advance of any other country, a fact which was demonstrated very clearly in the early air raids over England, and which made the Brit. Gov. again turn its attention seriously to A.s. In 1915 a number of non-rigid A.s had been built for anti-submarine work. By a stroke of fortune the Ger. *L 33* was brought down in England in Sept. 1916, in such a condition that it was possible to copy her design successfully in the Brit. *R 33* and *R 34*, completed in 1919. Under the treaty of Versailles Germany was forbidden to maintain A.s of over 1,000,000 cub. ft. capacity. Consequently she disposed of these A.s in part payment of reparations to the Allies. In May 1926, however, the limitation was removed. Great Britain, after the First World War, constructed a few A.s, notably the *R 100* and *R 101*. The *R 34* successfully crossed the Atlantic both ways (see ATLANTIC FLIGHTS). The Imperial Conference decided that A. routes were to be prescribed between the various parts of the Brit. Empire.

Design and Construction. There are great differences in design between non-rigid, semi-rigid, and rigid types of A. A non-rigid A. is one in which the internal pressure maintains the designed shape of the envelope without the assistance of a rigid keel. A semi-rigid A. has a rigid keel to distribute the load and assist in keeping the designed shape of a non-rigid envelope. A rigid A. has a rigid framework to maintain the designed shape of the hull. **Non-rigid Airships:** As in the case of a kite balloon, the shape is maintained solely by the internal gas pressure. The type which survived others of simpler frame was designed by Torres in Spain and was manuf. in France. Although in outline the shape is only a streamlined balloon, the circular shape is distorted to form a trefoil section, having 3 equal lobes. In this way an internal system of triangular bracing is possible, and to this the dead weight of the car and engine are carried by ropes.

The car is slung immediately underneath the envelope, rather than to the front of the ship, provision being made for the engine at the rear of the car. A pressure airscrew is employed, or separate engine units may be installed. The ballonets in the lobes maintain the shape of the envelope when the internal pressure is varied. To assist the retention of the A.'s shape, ribs are generally fitted at the nose in radial directions and taken back behind the plane of the nose. The ship is equipped with relatively large rudder and elevator planes, to the rear of which the rudder and elevator are respectively attached. The basket is fitted with a power plant and a propeller. The non-rigid A. or 'dirigible' balloon is the smallest of the types of A., and with increase of size the balloon becomes unwieldy and loses its shape. **Semi-rigid Airships:** These were introduced in order to relieve the envelope of a non-rigid ship from some of the strain arising from the connection of cabins, power cars, etc., thereby permitting an envelope of circular cross-section to be employed. For this purpose a keel consisting of a braced structure, generally triangular or rectangular in section, is suspended immediately below the envelope, and to this the dead weights of the car and engine are transmitted. In modern designs—e.g. in the case of the *Norge*—the keel is practically enclosed in the envelope so as to produce a good streamlined shape of low head resistance. **Rigid Airships:** The much larger ships are all of this type, and it is the only type which is likely to have any practical use in the future. The rigid type was developed in Germany by Count Zeppelin, and consists of a framework of girders whose external form corresponds with the shape of the A., the covering being directly attached to the girders. The earlier rigids were made with a relatively long central parallel portion and with a short head and tail; the parallel part underwent successive shortening until the modern perfect streamline shape was evolved. In order to obtain minimum resistance, the actual lines of the hull were determined from a consideration of the rates of change of curvature. Structurally the framework consists of a series of transverse hoops or rings connected to a series of longitudinals; both the rings and longitudinals are similarly constructed, frequently being triangular in section. The rings are polygonal, having approximately 25 sides. Provision is made for efficient connection between rings and longitudinals, while the whole structure is made rigid by a system of wire bracing. The space between 2 rings is occupied by a ballonnet, and there may be as many as 20 ballonnets in all. About half the bags are fitted with a manoeuvring valve on top, but each is supplied with an automatic valve which maintains the pressure at some predetermined amount, usually opening when the A. has reached an altitude of 20,000 ft. The navigating car is suspended near the nose of the ship and is fitted with the usual controls and

instruments. There is also an aft car fitted out as an auxiliary control car in case of emergency. The engines are installed in the rear of these cars. The *Hindenburg* was the most modern rigid type of A., and made its first flight in 1926. Its length was 800 ft, maximum diameter 135 ft, gas capacity 6,700,000 cub. ft. The structure in its main conception was the same as has been successfully developed during the past 35 years. It had 15 main transverse frames, each of which was a 36-sided regular polygon. Its passenger accommodation was arranged on 2 decks inside the exterior envelope. A control car and 4 engine gondolas were mounted externally. The outer fabric was doped with cello, mixed with aluminium powder on the outside to increase the heat reflection; on the underside the fabric was porous to assist ventilation. On its preliminary trial the ship attained 178 m.p.h. The *Hindenburg* was destroyed by fire in May 1937, when about to land at Lakehurst, New York, at the end of her first voyage of the year, 33 persons being killed out of a total of 97 on board. After the First World War the U.S.A. suffered serious A. losses in those of the *Shenandoah* and the *Akron*. The first of these losses did not retard development, and the authorities, profiting by experience, built mooring-masts across America, it having been found that operating A.s from their sheds limited their use. But further loss came when the *Akron* (U.S. Navy A.) crashed off New Jersey on 4 April 1933, in an electrical storm, with the loss of 74 of her 77 officers and guests aboard, including Adm. Wm. Moffett, chief of the Bureau of Aeronautics. Her loss was in fact due to the same cause as that which destroyed the *Shenandoah*. The *Akron* was not so large as the *Hindenburg*—being 785 ft long, with a gas capacity of 6½ million cub. ft and diameter 132 ft. A sister ship, the *Macon*, was launched in 1933. Great Britain, France, Italy, and Japan, however, all decided to abandon A. construction; but Germany, in no way dismayed, kept the *Graf Zeppelin* on passenger transport service as late as 1938. Great Britain's worst disaster was the loss of the *R 101* on 5 Oct. 1930. The A. had started on an official flight to India, but came down at Beauvais in France, being totally destroyed by fire; 48 of the company of 54 were burned to death, including Lord Thomson, secretary of state for air, Air Marshal Sir Seton Brance, and Maj. Richmond, the designer. The court of inquiry found that the accident was caused by a substantial loss of gas in bumpy weather. Had helium been used instead of hydrogen, the loss of life would not have occurred, but hydrogen was used because of its greater lifting power.

See V. C. Richmond, *Some Modern Developments in Rigid Airship Construction*, 1928, and E. F. Spanner, *About Airships*, 1929.

Airstrip, see AIRFIELD.

Airy, Sir George Biddell (1801-92),

astronomer, b. Alnwick. He entered Trinity College, Cambridge, in 1819. In 1836 he was appointed Astronomer Royal at Greenwich Observatory, where he made important researches. He determined the mass of the earth by comparing the values of *g* (the acceleration due to gravity) as measured with a pendulum at the top and bottom of a coal-mine. Among his works are *Astronomical Observations, Tides and Waves*, 1842, *Ipswich Lectures on Astronomy*, 1851, and *Treatise on the Errors of Observation*, 1861. See his autobiography, 1896.

Aisle (Fr. *aile*, Lat. *ala*, a wing), any lateral div. of a church or other edifice. Generally in England there is only 1 aisle on each side of the nave, but on the Continent there are sometimes as many as 3 in large churches.

Aisne (Lat. *Axona*): 1. Riv. of France, rising in Argonne (q.v.), and flowing N.W. and then W. through the depts of Marne, Ardennes, Aisne, and Oise to join the R. Oise (q.v.) near Compiègne. Length 175 m.

2. Dept in the N. of France, formed of parts of the auct. provs. of Picardy and Ile-de-France. It is generally flat, wooded in the N. and undulating in the S. A. is an important agric. dept, and noted for cereals, potatoes, sugar-beet, vines, and livestock. It has extensive industries, including textile, sugar, chemical, and metallurgical manufs. The dept is watered by the Marne, Oise, and Aisne (qq.v.). The prin. tns are Laon (the cap.), Château-Thierry, St-Quentin, Soissons, and Vervins (qq.v.). Area 2866 sq. m.; pop. 453,000.

Aisne, Battles of the. The valley of this riv., extending as it does from Compiègne and the vicinity of Noyon, through Soissons and the dept. of the Meuse to the Argonne forest and to within 25 m. of Verdun, was bound to be the scene of bitter fighting in any war in which the Ger. armies should invade France from the N.E. There were 3 B. of the A., fought respectively in 1914, 1917, and 1918, but the Brit. armies were not especially involved in the second battle, which began a few days after the Brit. attack at Arras had closed.

First Battle of the Aisne. The advance to the A. began with the allied victory of the Marne on 6 Sept. 1914, and continued until 1 Oct. When conditions stabilised, the trench warfare, which was to endure for 4 years, began. So far as the Brit. Army was concerned this warfare was improvised, for the only heavy guns it had were a few batteries of old 6-in. howitzers; and engineering stores were meagre. The compilers of the Brit. official *History of the Great War* conclusively refute the assumption that entrenchments had already been prepared on the A. heights in anticipation of retreat. Indeed no one had foreseen the deadlock which was to ensue, or envisaged the implications of scientific progress in the art of modern warfare whereby the hope of outflanking a line which could seemingly be endlessly extended was finally dispelled; and the long

routine of dreary trench fighting without tangible results set in.

The actual battle began on 13 Sept., the Germans being then N. of the riv. with their guns concealed on the N. slopes. Despite the depth of the riv. Maunoury with the Sixth Army, attacking on the left from Compiègne, succeeded in getting sev. divs. across; the Brit. Army sustained the general attack from the point of junction with the French at Soissons for a distance of 15 m. On the 14th Maunoury captured Nouvron and attacked the heights, only to find, as did the British after capturing Troyon, that the enemy positions on the high ground were invulnerable. On the 15th the Germans, counter-attacking, drove the French from Nouvron and the British back to the riv. Marshal Joffre, who was then in supreme command, next began a change of strategy, lengthening his left by forming 2 new armies, but the only result of this collision of equally balanced forces was to force them out westward, and the same result ensued in the opposite direction when the Germans sought to outflank Gen. Sarrail on the Meuse.

Second Battle of the Aisne. This battle was begun on 16 April 1917 by Gen. Nivelle attacking the 'Hindenburg line' near Laon. His strategy was the antithesis of that of Joffre, whom he had succeeded, namely to deal a decisive blow rather than to wear down the enemy by attrition. He actually endeavoured to storm the A. heights in 1 supreme attack launched from 3 quarters simultaneously with the whole of his forces, the main offensive being in the vicinity of the lower ground before Laon. He captured the riv. banks from Soissons to Berry-aux-Bac, together with 20,000 prisoners and nearly 200 guns, but he found the road to Laon impregnable. His disastrous strategy caused a reaction to the Fabian tactics of Foch and Pétain, the latter being appointed generalissimo in his stead, and once more the allied armies settled down to a war of attrition, in which the side which should eventually receive heavy reserves at the decisive moment would of necessity win the day.

Third Battle of the Aisne. This battle was part of the Ger. offensive in Champagne, which extended between 27 May and 6 June 1918, the geographical limits, so far as the Brit. forces were concerned, being between the Chemin des Dames and the Montagne de Reims. E. of Verneuil. Ludendorff had recently held out hopes to Germany of a supreme and decisive effort before the Amer. armies could be thrown into the fray, inasmuch as he had driven a deep salient into the Brit. lines near Arras and the Ger. effectives still outnumbered those of the Allies. The offensive against the French was begun on the A. heights, this being the zone nearest to Paris and the Marne and the Paris-Châlons railroad. The Ger. preparations were made with dispatch and secrecy, and on 27 May the preliminary artillery bombardment began all along the line from Ailette to the environs of Reims. Before the day was over the

French had retreated from the heights N. of the riv. and the Ger. troops under Gen. von Boehn had crossed the riv. at Fismes, capturing numerous prisoners, guns, and other booty. Flushed with success, the Ger. command deepened its thrust from Fismes right to Château-Thierry on the Marne; but never for an instant did Marshal Foch allow his major strategy—the strengthening of his flank positions at Reims and Soissons—to be distracted, and before long the tide was destined to turn. *See also* MARNE, BATTLES OF THE.

Aissé, Mademoiselle (c. 1694–1733), Fr. letter-writer, b. Circassia. She was captured by Turks and sold in 1698 as a slave to the Comte de Ferriol, Fr. ambas. at Constantinople, who had her educ. in Paris. She attracted much attention by her beauty and romantic story. Her letters to Mme Calandrin, first pub. 1787, with notes by Voltaire, reveal her tenderness and fidelity. Other eds. appeared in 1846 by S. Ravenel, with an introduction by Sainte-Beuve, and in 1873 by E. Assé. *See also* her life by Courteault, 1900.

Aistulf, Astolf, or Astolphus (d. 756). King of the Lombards, succeeding his brother Rachis in 748. He captured Ravenna and the Pentapolis, 751–2, and marched against Rome. The Pope appealed for help to Pepin, King of the Franks, who defeated A. in 753. A. again besieged Rome in 756, and was forced by Pepin to give up the exarchate of Ravenna and the Pentapolis to the Pope.

Aithalia, see ELBA.

Aitutaki, one of the S. Cook Is. The main is. is volcanic whilst the lesser islets are of atoll formation. Total area 6 sq. m. A coral airstrip was built by Amer. forces during the Second World War. Tasman Empire Australian Line flying-boats regularly land on the lagoon to refuel. Pop. in 1954, 2555.

Aix, Fr. is. in the Bay of Biscay, opposite the mouth of the Charente, and in the dept of Charente-Maritime. The French defeated the British here in 1806, and there was an indecisive battle in 1809. Napoleon surrendered to the British here in 1815.

Aix-en-Provence (anc. *Aquæ Sextiæ*), Fr. city in the dept of Bouches-du-Rhône. It was founded in 123 BC and was known to the Romans as a spa. In the vicinity Marius (q.v.) defeated the Teutoni in 102 BC. From the 8th cent. until 1481 it was the most important city in Provence (q.v.). A. is a beautiful city, with an archiepiscopal cathedral (13th–15th cents.), other anc. churches, a baroque hall, fine 17th- and 18th-cent. houses, a univ. (founded 1409; the science and medical faculties are at Marseilles, q.v.), and an important art gallery. It is frequented as a resort and spa, has a trade in olives and almonds, and is noted for its nougat and its almond cakes (*calissons*). Cézanne, Mignot, Tournefort, and Vauvenargues (qq.v.) were b. here. Pop. 54,200.

Aix-la-Chapelle, see AACHEN.

Aix-les-Bains, Fr. spa in the dept of

Savoie. The Romans called it *Aquae Allobrogum*, and *Aquae Gratianae* or *Domitiana*; there are Rom. remains. It is in a picturesque valley. Pop. 14,600.

Ajaccio, prefecture and second city of the Fr. is. and dept. of Corsica (q.v.). It is on the W. coast of the is., at the N. side of the mt.-girt Gulf of A. The tn was the bp. of Napoleon I (q.v.); the house of the Bonaparte family, and the palace of Cardinal Fesch, Napoleon's uncle, are preserved as museums. There is a 16th-cent. cathedral, and there is a fine harbour. The chief industries are the anchovy and pearl fisheries. Olive oil and wine are exported. The tn is much frequented as a health and winter resort. Pop. 31,400.

Ajalon, modern **Yalo**, is mentioned in biblical hist. as the scene of Joshua's defeat of the Canaanites, when he is said to have made the sun and moon stand still till the victory was complete (Joshua x. 12-14). The miracle raises difficulties moral and theological, as well as cosmological. Various explanations have been given. One explains it as a misinterpretation of the poetical hyperbole uttered by Joshua, recorded in the book of Jashar, and at least 2 cents. later included in the book of Joshua with a prose comment. Others interpret it as a subjective experience. The place was given to the tribe of Dan.

Ajanta, vil. in Hyderabad state, India, where Sir Arthur Wellesley halted after the battle of Assaye (q.v.), 1803. Five m. to the N. are the world-famous caves of A. The 29 caves, which date between 200 bc and about ad 650 and were visited by Hiuen Tsang in ad 640, consist of chapels and monasteries. Many of them contain magnificent sculptures and exquisite frescoes, all strictly Buddhist in character. The frescoes, which have inspired a modern school of Indian art, have been expertly cleaned and good lighting arrangements have been made. They are one of the most remarkable sights in India.

Ajax, son of Oileus (the lesser A.), sailed against Troy with 10 ships. On his way home he was wrecked and escaped to a rock, but when he boasted that he would be saved in spite of the gods, Poseidon split the rock and A. perished (Homer, *Odyssey*, iv). Virgil says that he excited the anger of Athena (*Aeneid*, i).

Ajax, son of Telamon (A. the Great), a hero of the Trojan war. He fought Hector single-handed (*Iliad*, vii), defended the ships, and killed many Trojans (*Iliad*, xiii-xvii). When the armour of Achilles was awarded to Ulysses, A. in madness killed himself (Sophocles, *Ajax*; Ovid, *Metam.*).

Ajlun, dist. of East Jordan. It is almost entirely occupied by a settled pop. rather than Bedouin. In the mts of A., in biblical times, dwelt the tribe of Manasseh. On the foothills of these mts, 3 m. W. of Jerash, is a pleasant vil., Reimun, which has been identified with Ramoth-Gilead. Arx Ajlun was the crusaders' name for Qala'at al-Rabad -

surmounting the vil. of A.—the most important of the Saracen fortresses in Transjordan. The small agric. tn of A., 28 m. NNW. of Amman, has a pop. of about 2000.

Ajmer, or **Ajmere**, tn of central India, formerly cap. of Chief Commissioner's prov. of A.-Merwara, 220 m. SW. of Delhi. It is situated at the foot of Mt Taragarh (2855 ft) and enclosed by a stone wall. It was here that Emperor Jhangir received Sir Thomas Roe, ambas. of King James I. There is a tomb of a Muslim saint, Khwaja Muin-ud-Din Chishti (d. 1256), held in great reverence by Muslims. The Pushkar lake (7 m.) is reached through a spectacular pass and is, reputedly, the most sacred lake in India for Hindus.

Ajodhya, anct tn of Uttar Pradesh state, India, on r. b. of R. Gogra, 84 m. E. of Lucknow. A. is one of the great cities described in the Ramayana (q.v.) and one of the seven sacred Hindu shrines. It is now ruined, but the remaining temples are of great interest.

Akabah, see **Aqabah**.

Akbar (the 'great,' his proper name being Jalal-ed-din Mohammed) was b. in 1542 at Umarkot in Sind, W. Pakistan, when his father was fleeing to Persia from Delhi. He was probably the greatest of the Mogul emperors. In 1555 his father regained the throne, but d. in the same year. A. committed the care of the kingdom to a regent, Bahram Khan. At that time few of the provs. originally subject to the Mogul emperors were in submission, and Bahram reduced many of them. However, he was despotic and cruel, and in 1560 A. took the rule into his own hands. In 10 or 12 years he had conquered all India N. of the Deccan, and was able to devote himself to administration. His name as a ruler is inseparable from that of his minister, Abul Fazil, who later left an enduring record of the emperor's name in the *Akbar Nameh*. The pair ruled with wisdom and vigour, repressing vice with a firm hand. Roads were made, and commerce was encouraged in every way.

A.'s reign marked a departure from former Mogul rule in India, and is one of the most important periods in the religious and literary hist. of India. A. was not a fanatical or bigoted Muslim. He believed that the best in diverse religions could be synthesised, and called for Portuguese missionaries from Goa to explain Christianity to him. Ultimately he adopted an eclectic kind of Deism, while allowing religious liberty to his subjects. He encouraged literature and estab. schools throughout the country. See G. B. Malleson, *Akbar* ('Rulers of India' series), 1890.

Akenside, **Mark** (1721-70), poet, b. Newcastle. In 1739 he was sent to Edinburgh with the object of studying theology for the Presbyterian ministry. A year later he gave up this object for the study of medicine, and in 1744 took his degree of M.D. at Leyden. On his return he practised in Newcastle, Hampstead, and finally London. His haughty

and pedantic manner (satirised by Smollett in *Peregrine Pickle*) prevented him from gaining a large practice. His profession, indeed, would hardly have supported him had not his friend Dyson made him an allowance of £300 a year. He had pub. verses in the *Gentleman's Magazine* as early as 1737, but his literary reputation rests on his *Pleasures of the Imagination*, commenced in 1738 and pub. in 1744. Its didactic nature made it popular at the time; it was approved by Pope and tolerated by Gray. A. also wrote various medical treatises. See life by C. Bucke, 1832.

Akers, Elizabeth Chase (1832-1911), Amer. poetess, b. Maine. She was three times married. B. P. Akers, a sculptor, being her second husband. Her first vol. of poems, *Forest Buds from the Woods of Maine*, 1856, was so successful that she was able to go travelling on the proceeds. Other vols. were *The Silver Bridge*, 1886, and *The Sunset Song*, 1902. She is remembered best for her poem 'Rock me to Sleep.'

Akershus, co. surrounding Oslo (4908 sq. km.). Forestry and agriculture are carried on. Pop. 183,000.

Akhmim, tn of Upper Egypt, on Nile, 85 m. SE. of Assiut. A steamboat and mail station, and long famous for textile manufs. Pop. (1947) 34,229.

Akhmaton, Akhenaton, or Ikhmaton, Pharaoh of the 18th dynasty, succeeding his father Amenhotep (or Amenophis III) as Amenhotep IV. He was a religious fanatic, declaring that there was only one god, manifested in the visible sun's disk, Aton. This brought him into conflict with the priests of Amen, the supreme deity of Thebes. He therefore abandoned Thebes and founded a new cap. at Tell El Amarna, dedicated to Aton. He neglected other affairs, and his reign marks the end of Egyptian rule in Syria. Art in his reign was characterised by realism. He d. c. 1350 BC, after reigning about 17 years. See also EGYPT and TELL EL AMARNA. See A. E. P. Weigall, *Life and Times of Akhnaton*, 1910.

Akibah, Ben Joseph, see AQIBA, BEN JOSEPH.

Akka: 1. Pygmy negroid race inhabiting the African equatorial belt. The A. (Arab, *Tikki-Tikki*) are found along the upper course of the Aruimi and W. of Lake Albert, and were discovered by Schweinfurth about 1872. They are yellow-brown in colour, and about 4 ft 6 in. high, and live nomadically, apart from, though usually under the protection of, the taller races.

2. Vil. of the Sahara on the Moroccan border; one of the stations on the Morocco to Timbuktu caravan route.

Akkad, or Accad, N. of the 2 provs. into which anc. Babylonia (q.v.) was at one time divided, the S. being Sumer, possibly the biblical Shinar (Gen. x). The area took its name from the city of Agado which fl. under Sargon (q.v.). The language spoken was Semitic (old Akkadian) and the term Akkadian has since been applied generally to the

Assyrian-Babylonian languages. See also BABYLONIA.

Akkerman, see BELGOROD-DNESTROVSKYI.

Akmolinsk: 1. Oblast (prov.) of Kazakh S.S.R. in the Soviet Union. It lies between the Ishim and Irtysh rvs. Economy chiefly agric. (wheat, oats, millet), with semi-nomadic sheep-raising in W. Mineral resources in the course of exploitation include gold, antimony, coal, and bauxite. Pop. 56,000.

2. Cap. of the above prov., on R. Ishim, 300 m. SW. of Omsk. Pop. 100,000.

Akra Leuka, see ALICANTE.

Akras, see PALAZZOLO ACREIDE.

Akrai, see PALAZZOLO ACREIDE.

Akranes, tn on Faxaflói, Iceland, opposite Reykjavik, important trading and fishing centre. Pop. 3135.

Akri, see ACTIUM.

Akron, city, cap. of Summit co., Ohio, on Cuyahoga R., 30 m. S. of Cleveland. It manufs. rubber goods, machinery, chemicals, etc. Pop. 274,600.

Aksakov: 1. **Sergey Timofeyevich** (1791-1859), Russian writer. His *Family Chronicle* (trans. *Chronicles of a Russian Family*) and its continuation, *The Years of Childhood of Bagrov the Grandson*, draw a vivid picture of a Russian squire's family (A.'s own) in the 18th cent., and of conditions in Bashkiria, then being colonised.

2. **Konstantin Sergeyevich** (1817-60), son of the above, historian, literary critic, publicist, and playwright. He was the leader of the Slavophiles (q.v.) in the 1840's and 50's; he exposed the dark sides of the Russian reality, and advocated the emancipation of serfs with land and retention of the vil. com. (see MIR).

3. **Ivan Sergeyevich** (1823-86), brother of Konstantin and leader of the Slavophiles after his death, brilliant orator and publicist, publisher and editor of sev. newspapers which were in turn suppressed by the gov. He reached the height of his influence in 1876-8 when he was the mouthpiece of the general enthusiasm for the liberation of the Balkan Slavs.

Aksum, or **Axum**, anc. tn of Tigré, Ethiopia, 85 m. NW. of Antalo; now mostly in ruins, which include some very fine specimens of Gk architecture. It was formerly cap. of an Ethiopian kingdom, and, after the adoption of Christianity in the 4th cent., an eccl. centre. It is still regarded as a sacred city by the Ethiopians, and the anc. chronicles are kept in the church. The city surrendered to the invading It. forces under Gen. de Bono on 15 Oct. 1935. The possession of this traditional centre of Ethiopian life was of considerable importance to the Italians, the more so from the fact that it had been the centre of religious celebrations for the Ethiopian victory of 1896. But the Italians wished to avoid wounding the religious susceptibilities of the pop. by occupying by force of arms a holy city in which, according to tradition, there still rested the ark of the covenant which had been brought from Jerusalem by the son of King Solomon and the Queen of Sheba.

Hence the It. poem was conveniently solved by a deputation of priests, headed by their political and religious chief, the Nevrad, coming out and delivering the keys of the city to the It. commander. Pop. 10,000.

Aktyubinsk: 1. Oblast (prov.) of Kazakh S.S.R. of Soviet Union. Cultivation of cereals is growing but most of the area is devoted to livestock raising. There are chrome, nickel, and chemical deposits. Pop. 360,000.

2. Tn and cap. of the oblast. It has electro-technical and engineering works. Pop. 80,000.

Akureyri, tn of Iceland, on Eyjafjörður. It has a good harbour and is an important trading centre, and after Reykjavik has long been Iceland's greatest cultural centre; it has sev. schools of all grades and a flourishing printing and publishing trade, cloth mills, a boot factory, and a large dairy. Pop. 7518.

Akyab, dist. (area 5136 sq. m.) and tn in the Arakan div. of Burma. After the cession of Arakan in 1826 A. was made the seat of gov., and rapidly grew from a small fishing vil. into a leading port. Chief export rice, with sev. large rice mills. Pop. (dist.) 760,700; (tn) 38,000.

Al Beruni, see BERUNI.

Al-Farabi (c. 870-950), Arabic philosopher of Turkish origin. b. Farab in Transoxiana. He is best known as having introduced Aristotle to the Mohammedan world. A diligent commentator on the works of that philosopher from the Neo-Platonist standpoint, he applied the political theory of Plato to the problems of his day. He exercised considerable influence upon Avicenna and Averroes (qq.v.), and was known to the medieval schoolmen. His complete works (*Al-Farabi Opera Omnia*) were pub. at Paris in 1638. There are eds. of his philosophical treatises (*Al-Farabi's philosophische Abhandlungen*, 1892) and *Ideal State* (*Al-Farabi, Der Musterstaat*, 1900) by F. Dieterici. The *Book of Gems* with Ismail's commentary has been trans. by M. Horten, 1906. See I. Madkour, *La Place d'Al-Farabi dans l'école philosophique musulmane*, 1934.

Al-farghāni, see ALFRAGANIUS.

Al-Khwarizmi, Arabian mathematician, b. Khorassan, who fl. in the 9th cent. He studied and made important astronomical calculations at Bagdad. He wrote sev. books on mathematics, among which was one on Hindu arithmetic, containing dissertations on the quadratic equations, etc. The original name of the work was *Al-Jabr wa'l-muqabala*, which was corrupted into Algebra. This book was the basis on which all subsequent medieval works on algebra were founded.

Al-Kindi (fl. 9th cent. AD), Arabic philosopher, b. Bagdad. He was the first of the so-called Arabian school, and introduced into the Islamic world a system which combined Aristotelianism and neo-Platonism. His outlook was fundamentally religious, and he considered philosophy as the 'handmaid of revelation.' Of his numerous works, some moral treatises and an introduction to the

study of Aristotle have been pub. as follows: H. Ritter and R. Walzer, *Studi su Al-Kindi II*, 1938; M. Guidi and R. Walzer, *Studi su Al-Kindi I, Uno scritto introdotto allo studio di Aristotele*, 1940. See R. Walzer, 'The Rise of Islamic Philosophy,' in *Oriens*, 3, 1950.

Al-Mamun, or **Abdallah III** (c. 786-833), caliph of the Abbasid dynasty, the second son of Haroun al-Raschid (q.v.). After defeating his brother Amin he came to the throne in 813. He encouraged science and the arts, and was famous for his generosity and clemency, and for his own literary talent. He d. during a campaign against Emperor Theophilus.

Al-Mokanna ('the veiled'), so called because he used a veil of green silk to hide his ugliness or the effulgent radiance of his face. It is not certain what his name was, perhaps Hashim ibn Hakim. He was one of the many who revolted in central Asia against the caliphs and, like most of them, invoked the aid of religion, calling himself God. The movement lasted from about 780 to 786 when he perished in the flames of his fortress. He is the hero of Moore's *Lalla Rookh*.

Al Segno, It. musical term meaning 'to the sign.' It directs the musician to revert to the sign :S: and continue from there to the first double bar or to a place marked *fine* (end).

Al-Sirat (the path) is a bridge thinner than a hair and sharper than a sword over hell along which all must pass to reach paradise. This bridge is not mentioned in the Koran but is an accepted dogma of Islamic theology.

Alabama, the 'Cotton State,' one of the Gulf states of the U.S.A., bounded on the N. by Tennessee, on the E. by Georgia, on the S. by Florida and the Gulf of Mexico, on the W. by Mississippi, and having a gross area of 51,609 sq. m. In the extreme N. of the state is part of the fertile valley of the Tennessee; to the S. of this lies a hilly region containing parts of the Allegheny and Cumberland ranges, in which coal and iron are found. The centre of the state is occupied by the Cane-brake or Black Belt, one of the most fertile cotton countries in the world. To the extreme S. is a low-lying, sparsely populated dist., very heavily wooded. The country is well watered, and the A. and Tombigbee are navigable rivs. The leading industry of the state is still agriculture. A. ranks as one of the leading cotton-producing dists., and Indian corn, tobacco, rice, and wheat are widely grown. There are large coal, iron, and steel industries in the N., and cotton manuf. and the lumber trade are considerable. The climate is warm and equable and very healthy except in the low-lying land in riv. valleys.

A. takes its name from an Indian tribe, which formerly inhabited this region. The ter. now constituting A. was first explored in 1540 by the Spaniard, De Soto, who passed through it from Florida to the Mississippi. The first permanent settlement was made by the French on Mobile Bay in 1702, and was removed to the present site of Mobile in 1711.

Towards the close of the 17th cent. France asserted her title to this region, basing her claim on the discoveries of Marquette and Joliet, who descended the Mississippi to the Arkansas in 1673, and of La Salle, who sailed down the Mississippi to its mouth in 1682. England, too, claimed the region N. of the Gulf of Mexico, and the ter. now forming A. was included wholly or in part by the Carolina Charters of 1663 and 1665, and by the Georgia Charter, 1732. In 1763 the French, by the Peace of Paris, ceded A. to Great Britain; Florida, then a part of A., being also transferred to Great Britain by Spain. The treaties of Versailles and Paris led to complications over A. between the U.S.A., Spain, and England, but at the close of the 18th cent. all the present area of A., except that portion lying S. of the thirty-first parallel, was ceded by Great Britain to the U.S.A. The Floridas were transferred by Great Britain to Spain at the same time. In 1795 Spain relinquished her claims to the ter. N. of the thirty-first parallel. In 1819, after Spain had virtually given up all claims to any ter. in A., A. became a state with boundaries as at present, and was admitted to the Union.

Disaster befell A. in 1837 as a result of the corruption of the note-issuing state banks, and the state's public debt reached over 3½ million dols. Further trouble occurred over the slave-holding question, the 'Alabama Platform' definitely pronouncing against any infringement of slave-holding rights. A., in 1860, together with other cotton states, seceded from the Democratic National Convention, and as a Confederate state sent out the bulk of its male white pop. to fight against the N. After the war the Negro pop. gained the ascendancy and disfranchised the white voters, but financial disaster quickly followed, the state debt reaching 26 million dols. in 1874. In 1901 a new constitution greatly curtailing the Negro voting power was adopted. A. has 37 railways, 8 of them trunk lines. More than a third of the landowners are coloured; there are strict laws against the marriage of whites and Negroes. Pop. (1950) 3,061,743, of whom 67 per cent are white. The state cap. is Montgomery (pop. 106,500); the seaport is Mobile. Prin. tns, Birmingham, Gadsden, Tuscaloosa, Anniston.

'Alabama,' The, Confederate cruiser in the Amer. Civil War which, causing immense loss to the commerce of the Federal states, gave rise to the celebrated Alabama question, and led to strained relationship between the govs. of the U.S.A. and Great Britain. Britain accorded to the Confederates the status of belligerents, and was lax in the enforcement of strict neutrality. This very nearly precipitated a war between the 2 countries, which was only averted by arbitration. The A. was built in the yard of Messrs Laird & Sons, Birkenhead, and the vessel, before coming out in her true light by being named after one of the seceding states, was known as No. 290, i.e. her number in the builders' yard; on the pretext of making a trial trip, she

steamed down the Mersey and out to sea on 29 July 1862. She made for the Azores, where, under the direction of her commander, Capt. Semmes, she was equipped with arms and ammunition. Thus armed she sailed forth on 24 Aug. In all she captured some 68 vessels and inflicted direct damage to the extent of nearly £1,000,000. Finally, on 19 June 1864, the Federal warship *Kearsarge*, commanded by Capt. Winslow, caught the A. off Cherbourg, and after an hour's engagement, in which the latter vessel was reduced to a sinking condition, Capt. Semmes surrendered. The prolonged negotiations between this country and the U.S.A. eventuated in the treaty of Washington, 1871, by which it was agreed to refer the dispute to a court of 5 arbitrators, one each to be nominated by Britain, U.S.A., Italy, Switzerland, and Brazil. This court sat at Geneva in Dec. 1871, and awarded the U.S.A. \$13,500,000 in respect of damage done by the A. and 2 other vessels, the *Florida* and the *Shenandoah*. The question is discussed in most works on International Law. See G. W. Lowrey, *English Neutrality*, 1863; W. Dwinelle, *American Opinions*, 1870; M. Bernard, *Neutrality*, 1870.

Alabama River, 315 m. long, is formed by the confluence of the Goosa and the Tallapoosa near Montgomery, the cap. of A. A short distance above the Mobile it unites with the Tombigbee to form the Mobile and Tensaw Rs. With its tribs. it drains the greater part of the state of Alabama.

Alabaster, term applied to 2 different minerals. The A. of the ancients is said to have derived its name from the tn of Alabastron in Egypt. It is a hard, marble-like carbonate of lime formed by a stalagmitic process, and was in much demand for ornamental purposes. The 'alabaster box of very precious ointment,' mentioned in Matt. xxvi. 7, was made of this substance.

The A. of the present day is gypsum (q.v.), a hydrated sulphate of lime. It is a much softer mineral than the anct A. and slightly soluble in water, but it is used for making ornaments, statuettes, plaster, and plasterboard for building, etc.

Alacoque, Marguerite-Marie, St, see PARAY-LE-MONIAL.

Alagoas: 1. A state of NE. Brazil since 1889, bounded on N. and NW. by Pernambuco, of which it was originally part (until 1817), on SW. by Sergipe, and on the E. by the Atlantic. It has an area of 11,016 sq. m., and a pop. of about 1,173,000. The soil is fertile, and the country well watered, but agriculture is only sparingly carried on owing to the tropical climate. The chief products are sugar, tobacco, coffee, and cotton. Maceió is the cap.

2. Tn in state of same name, near the coast, on Lake Manguaba. Formerly the cap. of the prov. Now called Marechal Deodoro. Pop. 19,000.

Alais, see ALÈS.

Alajuela, cap. of prov. of same name, Costa Rica, 12 m. NW. of San José and

summer resort for the cap., being 3080 ft above sea level. The centre of an important coffee and sugar dist., A. is a cathedral city and commercial tn; prov. is agric. area with stock raising and lumbering in lowlands. Area 3700 sq. m.; pop. 15,297, (prov.) 148,850.

Alalakh, cap. of anct kingdom covering the Amq plain in Syria, mod. Tell Atshana or Acana, E. of Antaakya (Antioch) on R. Orontes. Fl. in 18th and 15-14th cents. BC. The site was excavated by Sir C. L. Woolley in 1937-9, 1946-50, and yielded inscriptions and the palace of its ruler Iarlimlim and his successors. Originally explored in the hope of tracing the relation of the E. Mediterranean, Hittite, and Mesopotamian civilisations, it furnished evidence of the Syrian and Hurrian culture of a period somewhat earlier than that at Ras Shamra (q.v.). See C. L. Woolley, *A Forgotten Kingdom*, 1953, and D. J. Wiseman, *The Alalakh Tablets*, 1953.

Alaleona, Domenico (1881-1928), It. musical composer, b. Piceno. He won a place among modern It. musicians as a national composer of marked originality. His *Canzoni italiane* and *Laudi italiane* are collections which revive the songs of his people and make an attempt to reconstruct a basis for the symphony and for modern instrumental music. A. also contributed some important studies of It. musical hist.; his book *Studi sulla storia dell'oratorio musicale in Italia*, 1908, 1945, contains much valuable research.

Alamanni, or Alamans, see ALEMANNI. **Alambagh**, fort in India about 4 m. from Lucknow, which during the Indian Mutiny in 1857 was used as a fortress by the rebels. It was taken by Havelock and Outram, and was later defended for a long period by the latter. Here is Havelock's tomb.

Alameda, residential city in A. co., California, 6 m. from San Francisco. Pop. 36,256.

Alamo, 'Thermopylae of America,' originally a Franciscan mission, but used at the end of the 18th cent. as a fort. In the Texan War of Independence (1836) a party of Texans and Americans numbering slightly over 180 held it against a large number of Mexicans under Gen. Santa Anna. Continued assaults were repulsed from 24 Feb. to 6 Mar., when the Mexicans, after storming the fort three times, obtained entrance. In the resultant hand-to-hand fighting all the defenders were killed. David Crockett (q.v.), James Bowie, and Wm B. Travis were among the dead.

Alanbrooke, Alan Francis Brooke, 1st Viscount (1883-), Brit. soldier, b. Bagneres de Bigorre, France, son of Sir Victor Brooke, of Co. Fermanagh, Ireland. Ednc. abroad and at the Royal Military College, Woolwich, passing out into the R.F.A., 1902. Went to France in 1914 with the Secunderabad Cavalry Brigade, 1915; Adjutant, 2nd Indian R.H.A. Brigade, 1915; G.S.O.I.R.A., First Army, 1918. Commandant, School of Artillery, 1929-1932; Army Instructor, Imperial Defence College, 1932-4; Commander, 8th Infantry Brigade, 1934-5; Inspector, R.A.,

1935-6; Director of Military Training, War Office, 1936-7; Commander of Mobile Div., 1937-8; G.O.C.-in-Chief, Anti-aircraft Command, 1939, G.O.C.-in-Chief, S. Command, 1939-40; Commander of Second Army Corps, B.E.F., 1939-40; Commander-in-Chief, Home Forces, 1940-1. Chief of the Imperial General Staff, 1941-6. Field Marshal, 1944. Master Gunner of St James's Park from 1946; Lord Lieutenant of co. of London from 1950; Constable of Tower of London, 1950-5. See Sir A. Bryant, *The Turn of the Tide*, 1957, based on A.'s diaries of the Second World War.

Aland Islands, see ÅHVENANMAA.

Alans, Iranian-speaking tribe which in the first cent. AD lived in the steppes between the Caucasus and the R. Don. They were routed by the Visigoths in the 5th cent.

Alaouites (Alawis), Territory of the, dist. of Syria created by France as mandatory when pre-war Syria was partitioned into sev. states. In 1921 the then newly formed state of the A., together with those of Damascus and Aleppo, was made into a Syrian federation, but from 1924 to 1930 the A. constituted a separate regime under a Fr. governor. Cap. Latakia. See also SYRIA.

Alaroón, Hernando de, Sp. navigator in the 16th cent. In 1540 he sailed from Acapulco to support the expedition under Vasquez de Coronado in search of the 7 cities of Cibola (Mexico). By exploring the Gulf of California he proved that California was not an is. He also ascended the Colorado R. A report of the expedition occurs in Hakluyt's *Voyages*, and the earliest known map of the region was made by Castillo, one of his pilots. See Herrera, *Decade VI*, Bk 9, and Hakluyt's *Voyages*.

Alaroón, Juan Ruiz de (c. 1581-1639), Sp. dramatist, b. Mexico, d. Madrid. He graduated in Mexico in 1606, and in 1622 went to Spain to fill a position under the council of the Indies. In 1628 his first vol. of 8 dramas was pub. at Madrid. The second vol. of 12 plays appeared at Barcelona in 1635. His work includes heroic drama, character-plays, and comedies of intrigue, and ranks very high in Sp. literature. His plays are carefully written in polished style, his masterpiece being *La Verdad sospechosa* (imitated by Corneille in *Le Menteur*). Others are *Las Paredes oyen*, *El Tejedor de Segovia*, and *Todo es ventura*. He received little contemporary appreciation; he was a hunchback, and cruelly pilloried for this defect. See P. Henriquez Ureña, *Don J. R. de Alarcón*, Mexico, 1914.

Alarcón, Pedro Antonio (1833-91), Sp. novelist and statesman, b. Guadix, d. Madrid. He was intended for the Church, but soon took up journalism, writing for the *Eco del Occidente* of Cadiz, and after the revolution of 1854 editing *El Látigo*. He accompanied the Morocco campaign of 1859 as a correspondent, publishing in 1860 an excellent diary of his experiences. In 1864 he entered the Cortes as Liberal member for Cadiz, and he later filled many important posts. His short stories,

poems, and essays were collected under various titles in 1871, 1875, and 1883. His later novels, many on religious subjects, were not so popular as his sketches and studies of rustic Spain. Among his works are *Diario de un testigo de la guerra de Africa*, 1860; *Fortas seriosas y humorísticas*, 1870; *El Sombrero de tres picos* (*The Three-cornered Hat*), 1874, and *Costas que fueron*, 1882.

Alarcos, see **CUBAD REAL**.

Alaric I (376-410), King of the Visigoths. In 394 he commanded the Gothic allies of Theodosius against Eugenius. On the death of Theodosius in 395 he led a Visigoth revolt against the Romans, and invaded Greece in 396. Arcadius made him governor of Illyricum and the Visigoths elected him their king. In 400 he invaded Italy, but was defeated by Stilicho at Pollentia and Verona in 403. After Stilicho's execution effective opposition to A. ceased. He ravaged N. Italy and eventually besieged Rome, and captured and sacked it in 410. He went on to invade S. Italy, but d. suddenly the same year at Cosentia.

Alaric II (d. 507), King of the Visigoths. He succeeded Euric in 485, and was a wise and tolerant ruler, ordering the compilation of the *Breviarium Alaricianum*, a selection from Rom. legal writers, for the use of his governors. His prosperity ultimately brought him into conflict with the Frankish king Clovis, who, on religious grounds (A. was an Arian), made war upon A., whom he defeated and killed at Vogladensis (modern Vouillé), near Poitiers. See also **GOTHs**.

Alarodian Languages, name which was applied by philologists to the Caucasian group of languages. The term is derived from the Alarodii of the classical geographers.

Ala-Shan, dist. of Inner Mongolia, occupying the S. part of the Gobi Desert. It is about 800 m. long and 480 m. wide, and is very sparsely inhabited by Oluts, the pop. being about 20,000. The dist. is an arid sandy plain, with occasional low hills and chalk downs. A little grazing is done where the absence of saline deposits permits. To the E. is the A.-S., or Khara-Narin, range, reaching 11,000 ft. The prov. was annexed by China in 1636.

Alaska, ter. of U.S.A., occupies the extreme NW. corner of N. America, with the adjacent is., being bounded on the N. by the Arctic Ocean, on the E. by the Yukon dist. of Canada and Brit. Columbia, on the S. by the Pacific Ocean, and on the W. by Bering Sea and Straits. It was formerly known as Russian America. It has an area of 590,884 sq. m., and a pop. of 128,600, of whom nearly 28,000 are whites and the remainder chiefly Indians, with a few hundred Japanese, Negroes, and Chinese. There is a floating pop. of 20,000 (excluded from the above) employed in the mines, on the railways, and in the canning industry. The country may be divided into 4 dists. The Pacific mt. belt, along the S. coast, contains 4 ranges, the Coast, the St Elias, the Aleutian, and the Alaskan, apparently a

continuation of the Coast Range of W. America. Sev. lofty peaks are found here, including Mt Sanford, 16,200 ft; Mt St Elias, 18,024 ft; Mt McKinley, 20,300 ft; and Mt Foraker, 17,000 ft. This dist. comprises the basins of the Copper and Susitna rivs. The coast is deeply indented and precipitous, and bordered by numerous is. The Central Plateau, at an average elevation of 3000-5000 ft, is a rolling upland with deep channels trenched by rivs., the chief of which are the Yukon and the Kuskokwim. The Rocky Mt system, which enters A. as a wide belt comprising sev. ranges, with peaks of 7000 and 8000 ft, merges into the Endicott Range, and dies away towards the Arctic Ocean. The Arctic slope, divided into the Anaktuvuk plateau and the featureless coastal plain, is as yet very little known. But in 1938 a Harvard Univ. expedition, led by Bradford Washburn, discovered, during aerial reconnaissance, a huge inland ice-field, which is now computed to be nearly 250 m. long and to be the source of the huge glaciers of A., such as the Bering glacier (30 m. wide) and the Malaspina (50 m. wide). The ice-field is hemmed in by a maritime mt. range, whose peaks range from 10,000 to nearly 20,000 ft above sea level. This range extends from the Copper R. valley above Cordova to the Alsek R. valley in the Yukon. The rivs. of A. are large, numerous, and navigable. The great system of the Yukon falls into the Bering Sea. The N. rivs. are comparatively unimportant. The chief industries of A. in the past have been fish and fur. The salmon fisheries are very fine. Whaling has lately fallen off considerably. The fur trade, comprising seal, sea-otter, and sev. varieties of fox, is also on the decrease. Reindeer have been brought in from Siberia, and there are now upwards of 600,000 head in the country, yielding an increasing tonnage of reindeer meat for export. The number of foxes is also increasing, and the value of fur-bearing animals exported reaches £175,000 a year. Salmon-fishing is an important activity, and there are adequate stringent laws for the protection of the fisheries. There are also valuable fur-seal herds on the Pribilof Is., the estimated number of animals being close to 2 million. Agriculture suffers from the shortness of the summer, but the soil appears to be rich, and experiments go to show that numerous hardy vegetables and sev. cereals may be grown in many parts of the country, while the abundance of grazing grasses offers possibilities of pastoral development. The timber resources are still untouched. The mineral wealth of A. has only lately been exploited. Gold was first found in 1850, and prospecting has gone on ever since, though as yet no veins of the richness of the Klondike deposits have been found. Gold is worked chiefly in SE. A., where a low-grade ore is found, on the Yukon R., and on the W. coast. The value of gold production in recent years has been more than \$25,000,000,000 per annum. Copper, silver, coal, lignite,

gypsum, and marble are also mined. A. trades almost exclusively with the U.S.A., and to the Amer. NW. states and Seattle the trade is an important one. The range of climate is considerable. A. has short, very hot summers and long, severe winters. The seat of gov. is at Juneau (6000); other important tns are Ketchikan, 5300; Anchorage, 11,300; Sitka, 2000; Fairbanks, 5800; and Nome, 1900. There are some 18 incorporated tns; most of them are equipped with all modern advantages, such as electric lighting, and some of them have up-to-date means of

George, Brit. Columbia, via the Rocky Mt Trench to an intersection with the Alaskan railroad SW. of Fairbanks. The gov. of A. is charged with the education of the whites, while education of the native elements is in the hands of the Alaskan div. of the U.S. Office of Education. There is an agric. college and school of mines at Fairbanks.

Boundary Commission, 1903. The dispute between the U.S.A. and Canada began with a treaty between Russia and Great Britain in 1825, which laid down a boundary line for that part of the deeply indented coast which runs up from the Portland Canal to Mt St Elias, embracing a narrow strip of coastline and the Alexander Archipelago; this line, which was to follow 'the tops of the mountains parallel to the coast, to meridian 141,' limited the strip to 10 marine leagues from the coast, following the windings of the coastline. In 1867 the U.S.A. purchased the Russian-Alaskan Co.'s ter., and then followed a period of disputes between Canada, the U.S.A., and Great Britain on the question whether the international line was to go across or round the indentations of the coast. An attempt to settle this dispute by a joint high commission in 1897 broke down, but in 1903 it was agreed to decide the question by a commission of 6 'impartial jurists' from Canada, U.S.A., and Great Britain. The commissioners were Lord Alverstone, Lord Chief Justice of England; Sir L. Jette and Mr A. B. Aylesworth of Canada, lawyers of repute; and Senator H. C. Lodge, Hon. Elihu Root, and Senator G. Turner of the U.S.A. The decision, not signed by the Canadian representatives, favoured the Amer. contentions, giving Canada no access to the inlets down to the Portland Canal, and only 2 of the is. claimed. In Canada much feeling was aroused against Lord Alverstone's vote as being dictated by Brit. policy in regard to the U.S.A., but the award has since come to be looked upon in Canada as a good workable compromise. See a series of articles in 1908-9 in the *University Magazine* of Montreal. At the end of 1938 the Brit. Columbia Legislature voted \$25,000 for a preliminary survey of a proposed highway connecting A. with the U.S.A. through Brit. Columbia. The President of the U.S.A., at the same time, appointed a commission to study routes and costs (see next section).

The Alaska Highway. The A. Highway was opened on 29 Oct. 1942. It is 1523 m. long, and runs from Dawson Creek, Brit. Columbia, following the general line of the airports which Canada had constructed at Fort Nelson, Watson Lake, and Whitehorse, and thence via Boundary and Big Delta to Fairbanks. The highway links A. and the U.S.A. There has been much joint effort between Canada and the U.S.A. for the development of A., particularly in relation to Brit. Columbia. On 23 Jan. 1943 the joint economic committees of the 2 countries undertook an international study of the vast region comprising A.,



S. & G.

THE OLD PIONEER ROAD

A section, later abandoned, of the Alaska Highway, near Champagne, Yukon.

water supply. The best harbour along the W. coast is at Teller on Port Clarence, near the W. tip of Seward Peninsula. A. was discovered by Vitus Bering (q.v.) in 1741. In 1867 it was purchased from Russia by the U.S.A. In 1906 A. received power to elect a delegate to the U.S. Congress. A law was passed by the Congress in 1912 conferring legislative power on A. and constituting Juneau the cap. of the ter.; it also created a railroad commission. The rail route from Seward to Fairbanks, projected in 1915, and completed in 1923, comprises altogether 500 m. of track and connects the terminus with the coal-fields at Matanuska. The U.S. Gov. has secured the consent of Canada for a railroad survey of a line connecting the Canadian National Railways with the Alaskan railroad. The route extends from the vicinity of Prince

the Yukon, and parts of the NW. Ters. and Brit. Columbia. This followed other co-operative action, particularly the setting up by President Roosevelt and Mr Mackenzie King of a joint defence board, and later various other joint boards were set up in the economic field. The major aspect of this great joint effort was the programme for the defence of A. and its use as a base for offensive action against Japan. The Defence Board recommended, and Canada constructed, a long line of air bases uniting the interior of the continent with the advanced posts in A. and N. Brit. Columbia. The construction of the airway to A. presented a problem of supply which could be effectively solved only by the building of a road, and the A. Highway was constructed by U.S. Army engineers and Canadian and Amer. contractors with remarkable speed. An offshoot from the A. Highway was plotted from Champagne to the deep-water landing at Haines on Lynn Canal, thereby greatly enhancing the usefulness of the highway as a channel of distribution. Canadian airmen, operating from Alaskan bases, attacked Jap. shipping and installations in the Aleutians. The last link in the highway from the NW. tip of the N. Amer. continent to the Panama Canal is under construction from the S. frontier of Mexico to Panama. The highway forms part of the Inter-Amer. Highway extending for 16,800 m. from A. to Argentina. Numerous countries are involved in the road, which runs from Fairbanks (A.) through Brit. Columbia to Seattle, and leaves the U.S.A. at Laredo (Texas). The A. Highway also formed a 'NW. passage' along which were transported vital supplies to Russia via the Bering Straits. See Benjamin H. Kizer, *The U.S.-Canadian Northwest*, Princeton, 1943.

Alauda (Lal., 'lark'), belonging to the family Alaudidae of the Passeriformes, is a gregarious bird. The wings are broad and long, the tail is short, the head feathers may form a crest. *A. arvensis* is the skylark, *Lullula arborea* the wood-lark.

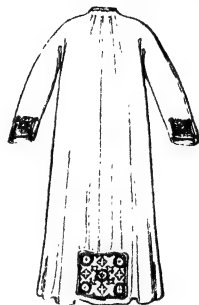
Alausi, tn in Chimborazo prov., Ecuador, 70 m. E. of Guayaquil, situated on a plateau of the Andes at an altitude of 8553 ft. A. is on the Guayaquil-Quito railway (the A. loop is an engineering triumph). Pop. 4800.

Alava, Sp. prov., largest and most southerly of the Basque provs. (q.v.). It contains part of the Cantabrian Mts (q.v.), and is watered by tribs. of the Ebro (q.v.), including the Zadorra. The mts are well wooded and rich in minerals, and in the valleys cereals, flax, hemp, fruit, oil, and wine are produced. The cap. is Vitoria (q.v.). Area 1176 sq. m.; pop. 119,350.

Alawis, see ALAOUTIS.

Alb, liturgical vestment consisting of a white linen tunic with narrow sleeves and a hole for the head, ultimately derived from the *tunica alba* of Rom. citizens. Originally plain, in the 10th cent. embroidered bands were employed for borders and cuffs, and later 'apparels', i.e. square patches of ornamentation, 4 or

5 in number, were added. Lace is often used at the cuffs and on the skirt.



ALB

Alba (ancient **Alba Pompeia**), It. tn in Piedmont (q.v.), on the Tanaro. It has a 15th-cent. Gothic cathedral. Pop. 8000.

Alba, Duke of, see ALVA.

Alba Iulia, or **Alba Julia** (ancient **Apulum**; Ger. **Karlsburg**; Magyar **Gyulafehérvár**), tn of Rumania, near the Mureş (q.v.), 45 m. NE. by N. of Hunedoara. It is one of the oldest tns of Transylvania (q.v.), and is on the site of the Rom. settlement of *Apulum*. Its bishopric was founded in the 11th cent., and its cathedral (rebuilt 1443) belongs partly to that time, and contains the tomb of Janos Hunyadi (q.v.). The union of Transylvania with Rumania was proclaimed at A. in 1918. Pop. 15,000.

Alba Longa (Castel Gandolfo, q.v.), ancient tn of Latium, Italy, on a ridge overlooking the Alban Lake, 15 m. SE. of Rome. Said to have been founded by Ascanius, son of Aeneas. It was the legendary bp. of Romulus and Remus and centre of the Lat. League. Destroyed by Tullus Hostilius, third king of Rome, it was never rebuilt.

Alba Pompeia, see ALBA.

Alba Regia, see SZÉKESFEHÉRVÁR.

Albacete: 1. Sp. prov. in Murcia (q.v.). It is in general a tableland, hilly in places, and has fertile valleys and plains. The main industries are stock-raising and agriculture. Area 5739 sq. m.; pop. 403,000.

2. Sp. tn, cap. of the prov. of A. It has a fine 16th-cent. church, still unfinished, produces wine and saffron, has a cattle fair, and is famous for its knives. Pop. 73,850.

Albacore, name given to the long-finned tunnies, *Thunnus alalunga* and *T. germo*. The pectoral fins are very long and sabre-shaped. The A.s rarely exceed a length of 3 or 4 ft.

Alban, St., protomartyr of Britain. b. Verulamium (now St Albans) in the 3rd cent., and converted to Christianity late in life. He suffered martyrdom by the sword about 304. King Offa founded the famous monastery of St Albans on the site of his death in 795. His feast is on 22 June.

Alban Hills (It. **Monti Albani**), mt range in the Apennines (q.v.), SE. of Rome (q.v.). The Appian Way (see APPIA VIA) runs at its foot, and on Monte Cavo (3100 ft; auct. *Mons Albanus*) stood the temple of Jupiter Latiaris (see JUPITER). See CAMPAGNA DI ROMA and ALBANO, LAKE.

Albani, famous Rom. family, said to have come originally from Albania and to have settled at Urbino in the 16th cent. The fame of the house began with the accession of Giovanni Francesco A. to the papal throne in 1700 as Clement XI. Numerous other members of the family

In 1911 she pub. her reminiscences, *Forty Years of Song*, and at her farewell concert at the Albert Hall received a purse of gold. In 1925 she was given a Civil List pension, and created D.B.E. Sullivan's setting of the *Golden Legend* was inspired by her voice, and Gounod composed his *Mors et Vita* as a special tribute to her.

Albani, Francesco (1578-1660), It. painter of the Carracci school, b. Bologna and d. there. He painted numerous altar-pieces, but preferred mythological or pastoral subjects. His 12 beautiful children served as models for many of his



A MOSAIC PAVEMENT
in the Byzantine Baptistery at Ravenna

E.N.A.

were cardinals and other high Church officials. Cardinal Alessandro A. (1692-1779) was a determined enemy of the Stuarts. He also formed the famous art collection at the Villa A. at Rome. The family died out in the 19th cent.

Albani, Dame Emma (1847-1930), stage name of Marie Louise Emma Cécile Lajeunesse, Canadian singer, b. Chambly, near Montreal. Trained in music by her father, she first appeared in public at Albany, New York, in 1863. After studying in Paris and Milan she made her opera debut at Messina in 1870 as Amina in *La Sonnambula*. In 1872 she appeared in London with the Royal It. Opera, later visiting Paris (1872), the U.S.A. (1874), St Petersburg (1878), Berlin (1884), etc. In 1878 she married Ernest Gye, lessee of Covent Garden. She later left opera for oratorio, and sang at all the chief festivals and before many European monarchs. On the eve of her retirement

most famous paintings, now at Rome, Dresden, and in the Louvre. He opened a Rom. academy.

Albania, auct. name of N. Azerbaijan (see AZERBAIJAN).

Albania, independent Balkan state made up of parts of the old Turkish provs. of Scutari, Yanina, Kosovo, and Monastir. Prior to 1939 it was a monarchy which, before 1912, formed a part of the Turkish Empire. It consists of a very mountainous strip of land lying on the W. shore of the Balkan Peninsula, between Montenegro and the N. boundary of Greece. Until recently it was little explored. The mts of N. A. form the watershed between the Aegean and the Adriatic Seas; they consist of a high mass of rocky mts which spread through Montenegro to the Adriatic. The highlands of A. may be described as lying in the N. and S., the mts of central A. being of a more undulating character. Owing

to the character of the mts, the rivs. which flow from E. to W. are not navigable. The chief rivs. are the Boyana and the Drin. The mineral wealth of A. is probably great, but the country is almost entirely unexploited. It has splendid forests, and produces wine and olive oil. The chief means of subsistence are cattle-rearing in the plains, sheep- and goat-rearing in the mts. The pop. of A. is roughly estimated at about 1,200,000. The chief tns are Tirana, Scutari, and Durazzo (q.v.). As a race the Albanians are one of the most anct in the Balkan Peninsula; they are noted for their sturdy independence and for the tenacity with which they have clung to their customs and traditions. The majority of the Albanians are Muslims; the remaining portion of the pop., roughly two-fifths, belong either to the Gk or the Rom. Catholic Church. A number of interesting Rom. remains proves the existence of a Rom. influence in A. Three ports, the present Pollina (Rom. Apollonia), Durazzo (Rom. Dyrrachium), and Avlona (Rom. Aulon), on the Adriatic, must have been thriving tns during the days of Rom. authority. After a long period of disuse, the two latter are gradually returning to a position of importance.

History. During the 4th and 5th cents. A. was in the hands of the Goths; in the 6th cent. it became a part of the E. Empire under Justinian, and in the following cent. came under the rule of the Serbs, who held it, with a short break, until the 14th cent. In the 12th cent. for a short period the Normans, under Robert Guiscard, tried to form a kingdom there, and Michael Comnenus, after the setting up of the Lat. Empire, retired to A. and tried to build up an independent kingdom. During the latter half of the 13th and the beginning of the 14th cent. the Aukevin kings of Sicily ruled A. The Serbs, however, re-estab. their power and retained it until the death of Dushan in 1360. Between the downfall of Serb rule and the estab. of Turkish power, A. was ruled by native chieftains. During the 15th and 16th cents., however, in spite of prolonged resistance, A. gradually fell into the hands of the Turks, finally becoming a Turkish prov. in 1748. In the 18th and early 19th cents. attempts were made by individual Albanian chieftains to estab. their independence in A., but these had no lasting success. At the conclusion of the Balkan wars (q.v.) the treaty of London settled the independence of A., May 1913: a ruler was to be chosen by the powers, and Prince William of Wied was invited to take up the office. On 21 Feb. 1914 Prince William received at Neuwed an Albanian deputation, consisting of Essad Pasha (q.v.) and a number of Albanian chieftains, who offered him the crown on behalf of the Albanian people, which he accepted. His position was beset with many difficulties, not least among which was the question of N. Epirus, where a revolt took place on his arrival in A. He was known in A. by the title of *Mpret* (said to be a modification of *Imperator*). It was evident, on

the outbreak of the First World War, that there was no stability in this arrangement of a petty principality created by the influence of Germany with the object of furthering Austro-Hungarian policy in the Balkans. Prince William left A. when Austria declared war on Serbia, and Essad Pasha became self-appointed ruler of the country. In Dec. 1914 Italy dispatched an expedition to Avlona on the Albanian coast as a set-off to Austrian aggrandisement in Serbia. The Entente in 1915 promised A. to Italy as part of the price of It. support in the war. Unaware of this, the Dual Monarchy, in



E.N.A.

AN ALBANIAN BOY

The donkey is carrying water.

the endeavour to purchase It. neutrality, offered Italy sovereignty over Avlona and a free hand in A. Later in 1915, however, after the Montenegrin cap. had fallen, the Austrians marched southward into A., captured Scutari, and reached the heights of Tirana (Jan. 1916). Meanwhile Bulgarian troops had also crossed the frontier and occupied El Bassan. The Italians evacuated Durazzo, but continued to hold Avlona, and so dominated S. A. At the conference in San Remo, 1920, A. was mandated to Italy. Later a rep. was proclaimed with a constitution providing for a Parliament of 54 elected members and a Senate of 18 under a president (Ahmed Zogu or Zog, 1925). In 1928 the Constituent Assembly proclaimed A. a democratic monarchy, Ahmed Zogu assuming the title of Zog I, King of the Albanians. In 1939 Italy suddenly invaded A., after air-raids over the chief tns. Zog fled the country, and soon afterwards the country was proclaimed an It. protectorate. The Italian move was generally interpreted as part of the Axis policy of encircling Yugoslavia, and also designed to give Italy still greater influence in the Mediterranean. In the course of the It. invasion

of Greece in 1940 the Greeks captured various strategic points in A., and but for Ger. intervention would probably have driven the Italians out of the Balkans. In 1942 the premier of the Albanian 'puppet' gov. of A. announced a programme for complete 'fusion' of the Italo-Albanian union, indicating that A. would be entirely absorbed into the It. Empire. But Albanian patriot forces eventually entered the cap. on 20 Nov. 1944, and Durazzo was liberated the following day, A. thereby regaining her independence. In Nov. 1945 the provisional gov. of Enver Hoxha was recognised by the allied govts.; elections held in Dec. 1945 returned a Communist-controlled assembly. In Jan. 1946 A. was proclaimed a People's Rep. It has since followed a policy in line with Soviet Russia's. Efforts have been made to give the country new industries and better communications (the first railway was built in 1947), and new measures taken to improve health and education, after the Soviet pattern. See BALKAN WAR, THE; SCUTARI; SERBIA.

Language and Literature. Albanian is an Indo-European language with no obvious affinity to any other, though some scholars have found features in common with certain Caucasian languages. The Lat. alphabet is used, and much of the vocabulary is borrowed from Greek, Latin, or Slavonic. It is divided into 2 dialects (Geg, spoken in the N., and Tosk, spoken in the S.); but a unified literary language has now been formed. The earliest fragment in Albanian is a form of baptism printed in 1462, now preserved in Florence. Albanian literature has fl. since the 17th cent., much of it in the Turkish period being pub. abroad (Italy, Egypt, etc.). It is especially rich in poetry, and there is an extensive folk literature. See S. E. Mann, *A Short Albanian Grammar*, 1932; *An Historical Albanian-English Dictionary*, 1948; *Albanian Literature: An Outline*, 1955.

See also C. A. Chekrczi, *Albania Past and Present*, 1919; R. Matthews, *Sons of the Eagle: Wanderings in Albania*, 1937; Julian Amery, *Sons of the Eagle: A Study in Guerilla War*, 1948.

Albano, Lake, It. lake, in Lazio (q.v.), 12 m. SE. of Rome, beside the Appian Way (see APPIA VIA). It is in the Alban Hills (q.v.), and is formed in the basin of an extinct volcano. The tunnel by which it is drained is said to owe its existence to a pronouncement of the Delphic oracle (see DELPHI) that Veii (q.v.) would not fall until the waters of A. reached the sea. Circumference 6 m.

Albans, St., see ST ALBANS.

Albany, Count, assumed name of the 2 brothers. John Sobieski Stobierski Stuart (1797-1872) and Charles Edward Stuart (1799-1880), who claimed to be descendants of the Young Pretender. Both served on the Continent under Napoleon till his final defeat, and then settled successively in London, the Scottish Highlands, and Austria.

Albany, Dukes of, title created first in 1398 and bestowed on Robert Stewart,

Earl of Fife. The title has been revived at various periods in Brit. hist., being conferred on Darnley by Mary Queen of Scots in 1565, held by James I, Charles I, and James II, and again bestowed on the youngest brother of George I, on the younger brother of George III, and on the second son of George III. It was finally revived in 1881 by Queen Victoria for her youngest son Prince Leopold.

Albany, Leopold George Duncan Albert, Duke of (1853-84), youngest son of Queen Victoria. He was known as Prince Leopold until created Duke of A. in 1881, and he married Princess Hélène of Waldeck-Pyrmont, 1882. His daughter Alice married the future first Earl of Athlone in 1904. His son succeeded to the dukedom of Saxe-Coburg in 1900, fought for Germany in the First World War, and was deprived of his Brit. titles in 1919. A. was a liberal patron of literature and education.

Albany, Louise Maximilienne Caroline, Countess of (1752-1824), eldest daughter of Prince Gustavus Adolphus of Stolberg-Gedern, b. Mons. She was married to the Young Pretender in the days of his decline, but the marriage proved childless and most unhappy. In 1780 she fled from her husband and threw herself on the protection of Henry Stuart, her brother-in-law. She then lived quietly and happily, interesting herself in literature. In 1788 Charles d. and she is said by some to have married the poet Alfieri. See life by G. R. Preedy, 1945.

Albany, Canadian riv., rising in Lake St Joseph and flowing into James Bay; total length, 500 m. It is navigable up to Martin's Falls. Fort A. stands at its mouth.

Albany: 1. The co. tn of A. co. and cap. of the state of New York, U.S.A.; situated on the W. bank of the Hudson R. The first settlement was made here in 1614 by the Dutch, who called the place Fort Nassau. In 1664 it was occupied and named by the English. In 1754 there was held here the general conference of the states, in which plans for a closer union were mooted. It played an important part in the Amer. war of independence, and became the state cap. in 1797. It has a number of magnificent public buildings, among which may be mentioned the state capitol (1879), one of the costliest in the U.S.A., the city hall, the Federal Building, and the state museum of natural hist. The capitol was partially demolished by fire in Mar. 1911, and many valuable documents were destroyed. A. is an important railway and commercial centre. The chief industries are brewing, oil refining, printing, publishing, meat packing, and the manuf. of machinery, chemicals, paper and wood products, heaters, foundry products, textiles, clothing, and food-stuffs. Pop. 134,995.

2. The co. tn of Dougherty co., Georgia, U.S.A., at the mouth of the Kinchafoona Creek, on the Flint R. It was settled in 1836, and became a city in 1907. It is a major market and processing centre for pecans and peanuts, and manufs. thread.

sheeting, hosiery, lumber, fertiliser, candy, and farm machinery. Pop. 31,155.

3. Co. seat of Linn co., Oregon, on the Willamette R. It is a rail, trade, and shipping centre for a farm and orchard area, and manufs. lumber, leather goods, and furniture. Pop. 10,000.

Albany, port and municipality of W. Australia, on the Princess Royal Harbour, 245 m. SSE. of Perth, with a fine harbour. It was first settled as a penal colony in 1826. Pop. 4760.

Albategnius, or **Al-Battān** (850-929), properly Mohammed ben Gebir ben Sinan al Battani, his surname being taken from his native tn Battan in Mesopotamia, Arab chief and astronomer who, while following in general the Ptolemaic system, made sev. improvements thereon. He obtained more accurate values of the obliquity of the ecliptic and of the precession of the equinoxes than those previously determined, and produced improved tables of the positions of the sun and moon. His astronomical treatises were trans. into Lat. by Plato Tiburtinus early in the 12th cent., and printed at Nuremberg in 1537 and 1645.

Albatross, a species of large sea bird belonging to the family Diomedidae, which together with the petrels forms the order Procellariiformes. The external nostrils are more or less tubular.

The Diomedidae contain 14 species of A. found in the S. Ocean and in the tropical and N. Pacific oceans. The wandering A. (*Diomedea exulans*), which has a wing span of up to 14 ft., is the largest oceanic bird. It ranges between latitudes 30° and 60° S. A.s feed mainly on squids and fishes and nest on remote oceanic islands. A single white egg is laid.

Albedo, astronomical term applied to the ratio of the light reflected from the surface of a body to that which falls upon it, e.g. the A. of the moon (1/14) is the fraction of the sun's light falling upon it which is reflected. The following A.s of some of the bodies of the solar system are taken from *Earth, Moon, and Planets*, by Fred L. Whipple (q.v.), but opinions differ regarding the actual figures. Mercury, 0.07; Venus, 0.59; Earth, 0.5; Moon, 0.07; Mars, 0.15; Jupiter, 0.44; Saturn, 0.42; Uranus, 0.45; Neptune, 0.52; Pluto, small.

Albemarle, Dukes and Earls of, variant form of the Norman name Aumale. The first earldom was created by William the Conqueror, who gave his brother-in-law Odo of Aumale the lordship of the Isle of Holderness in Yorkshire. In 1180 William de Mandeville, son of the adventurer of Stephen's reign, succeeded to the title by marriage. During the century following it was held in conjunction with the earldom of Devonshire, and towards the end of the reign of Henry III it lapsed to the Crown. Revived subsequently by the royal prerogative, it was conferred on Richard Beauchamp, Earl of Warwick, in 1419, and in 1660 the earldom was raised to a duchy and conferred on Gen. Monck by Charles II. The newly created title became extinct in 1688, but was conferred

in 1696 again as an earldom on Van Keppel, a trusted follower of William III, and has been in the Keppel family ever since. The 9th earl (b. 1882) succeeded to the title in 1942. *See also* MONCK, GEORGE.

Albemarle Sound, a large inlet on the coast of N. Carolina, about 55 m. long and 5-15 m. wide. It is crossed by the Intracoastal Waterway. It received its name from the Duke of A. of Charles II's creation.

Albenga (anct **Albium Ingaunum**), It. seaport in Liguria (q.v.). It is on the Gulf of Genoa (q.v.) at the mouth of the Neva. There are Rom. remains, a 5th-cent. baptistery, and numerous medieval buildings, including a 13th-15th-cent. cathedral. It is known for its peaches and artichokes. Pop. 11,000.

Albeniz, Isaac (1860-1909), Sp. pianist and composer, b. Camprodon, Catalonia. A musical prodigy, he learned the piano as a child, appearing in public at the Teatro Romea, Barcelona, when only 4. He led a picturesque life for some years as a concert-giver in N. and S. America, and later went to the Brussels Conservatoire, where he studied under the auspices of King Alfonso XII. He failed as a musical comedy impresario, but throughout his vicissitudes, including heavy losses in financial speculation, he was fortunate in receiving, at crucial moments, the protection and influence of the best advisers, including the Conde de Morphy, the Sp. musicologist. In musical reform A. was an innovator of the 'new Spanish school,' and his name as a piano composer is known in all countries. As pianist he was specially famous for his rendering of Couperin, Scarlatti, Bach, Chopin, and Schubert. Eventually he gave up the piano to devote himself to composition. His operas include *Peppita Jimenez*, *Henry Clifford*, and *Merlin*; among his other works are the orchestral suite, *Catalonia*, and a great number of piano works, including the 12 magnificent pieces entitled *Iberia*.

Alberni, *see* PORT ALBERNI.

Alberoni, Giulio (1664-1752), It. bishop and Sp. politician, b. near Piacenza, Italy, where his father was a gardener. He took priest's orders and came to Rome, becoming secretary to the Duke of Vendôme, and accompanying him to Spain. He helped in the arranging of the Sp. king's marriage to Elizabeth Farnese of Parma, and was rapidly pushed forward by the queen. By 1715 he was prime minister of Spain and he was made a cardinal 2 years later. His internal policy included many salutary and much-needed reforms, but he met with much opposition from the nobility. He reorganised the army, and realised that the power of Spain depended very largely upon the size and state of her navy. He also reorganised finances, and threw open the trade with the Indies. By his invasion of Sardinia in 1718 he provoked the Quadruple Alliance (England, Holland, France, and the Holy Rom. Empire). This resulted in his downfall, and in 1719 he was forced to leave Spain.

Albert (1490-1568). Duke of Prussia, a cadet of the house of Hohenzollern, was, by the influence of the Emperor Maximilian, created grand master of the Teutonic Order of Prussia (1511). He subsequently became a Lutheran, secularised the estates of the Teutonic knights, and changed the mastership into a hereditary dukedom, becoming Duke of Prussia. This marked an important step forward in the foundation of the later Prussian state.

Albert, pseudonym of Alexandre Martin (1815-?), Fr. artisan who took a prominent part in the revolution of 1848. After this he was associated with Blanc (q.v.) in the provisional Gov. After a period in prison he was released, but reappeared in the Commune of 1871, following which his hist. is unknown.

Albert III (1414-86), elector of Brandenburg, surnamed Achilles, *b.* Tangermünde. Quite early in his life he distinguished himself as a warrior. On the death of his father he received the ter. of Ansbach and took his place as one of the leading Ger. princes. After a war against Nuremberg he was forced to recognise its independence. In 1470 he became elector of Brandenburg. In 1472 he finally brought Pomerania under his rule. He handed over his possessions in Brandenburg to his son in 1473 and retired to his Franconian possessions. He was one of the greatest and most ambitious of Ger. princes.

Albert I (1875-1934), King of the Belgians, son of Philip, count of Flanders. He succeeded his uncle, Leopold II, on 17 Dec. 1909. In 1900 he married Elizabeth (*b.* 1876), daughter of Duke Charles Theodore of Bavaria, by whom he had 3 children, Leopold (*b.* 1901), Charles Theodore (*b.* 1903), and Marie José (*b.* 1906). He was popular with his subjects and progressive in his policy. In the First World War he shared the hardships and vicissitudes of his armies during the Ger. invasion. When, in Oct. 1918, the Allies renewed their victorious advance on the W. front, his troops swept, within a fortnight, from Dixmude to the suburbs of Ghent, and on 13 Nov. he formally entered that city. Antwerp on the 19th, and Brussels on the 22nd. In Feb. 1931 he was killed in a mountaineering accident in the Meuse valley, 40 m. from Brussels.

Albert I (c. 1249-1308), son of Rudolf of Hapsburg, the founder of the Hapsburg dynasty. A. was not elected emperor on the death of his father, but was passed over by the electors, from motives of fear and jealousy, in favour of Adolf of Nassau. Adolf proved himself too weak to rule well, and was deposed and slain by the electors led by A. In 1298 A. was elected and crowned. During the 10 years that he reigned he followed an energetic and ambitious policy which resulted in the reduction of Germany to obedience; though he did not succeed in annexing Holland and Zeeland. He was murdered by his nephew John of Swabia.

Albert II (1397-1440), King of Hungary and Bohemia, succeeded Sigismund

as emperor in 1437. He d. as he was preparing to take the field against the Turks, who were ravaging Hungary.

Albert, Archbishop of Magdeburg (1490-1545), younger son of John Cicero, elector of Brandenburg. He became in 1513 Archbishop of Magdeburg, in 1514 Archbishop-Elector of Mainz, and in 1518 a cardinal. By the use of the services of Tetzels in the sale of indulgences, he may be said to have been directly involved in the events which touched off the Ger. Reformation.

Albert, Archduke of Austria (1559-1621), third son of the Emperor Maximilian II. Brought up in the Sp. court, he became cardinal-archbishop of Toledo, and later viceroy of Portugal (1594-61). In the latter year he succeeded the Archduke Ernest as governor of the Sp. Netherlands. His work in the Netherlands was chiefly directed against the power of France; in 1596 he captured Calais, thus inflicting a severe blow on the French; he failed, however, to retain Amiens and retired to the Netherlands. In 1598 he renounced his orders and married the Infanta Isabella, receiving the sovereignty of the Netherlands; in 1609 he concluded a truce with the Dutch.

Albert, Margrave of Brandenburg (c. 1100-70). A., usually known as A. the Bear, was Margrave of the N. Mark, situated between the N. courses of the Elbe and the Oder. Later he acquired Brandenburg, the nucleus of the later kingdom of Prussia. Sometimes in rivalry, sometimes in alliance, with Henry the Lion, he was an important factor in the civilisation of N.E. Germany.

Albert, Prince Consort (1819-61), husband of Queen Victoria of Great Britain and Ireland. Albert Francis Charles Augustus Emmanuel, the younger son of Ernest, Duke of Saxe-Coburg-Gotha, was *b.* at Schloss Rosenau, near Coburg, and married Victoria, his first cousin, in 1840. The marriage proved to be an ideally happy one. A.'s position, however, was one of great difficulty and needed the utmost tact, and at first Victoria herself would let him take no part in State affairs. He was made regent in 1840 in case of the queen's death; he soon came to help the queen with advice in all her political duties, though only after his death did the full value of his work become apparent. A.'s interest in science and the arts had been stimulated by a model educ.; he had a natural political flair and understanding for diplomacy, though his position meant that all his influence had to be exercised indirectly. In addition, he was keenly interested in social and economic progress, and it was through his suggestion that the Great Exhibition was held in 1851. His natural reserve and continental connections tended to act against his popularity in the country as a whole; the queen, however, never recovered from the shock of his premature death from typhoid, and remained in mourning for him for the rest of her life.

Albert, Prince of Bayreuth (1522 ?), surnamed the Warlike, or Alcibiades,

was a son of Casimir of Bayreuth and a member of the Hohenzollern family. In 1541 he received Bayreuth as his share of the family possessions, and is sometimes referred to as the margrave of Brandenburg-Kulmbach, after the name of the chief of its principality. He took part in many campaigns, sometimes for, sometimes against, the Emperor Charles V. He was noted throughout Europe for his bravery and deeds of valour. He was eventually put under the ban of the empire and fled to France, where he took service under Henry II, dying shortly afterwards.

Albert, Prince of Mecklenburg (d. 1412), King of Sweden, was called to the throne in 1365 by the nobility who had deposed Magnus II. After a long war peace was re-established. In Sweden in 1389, when A. retired to Mecklenburg, where he d. Margaret (q.v.) succeeded him, and united the 3 N. kingdoms under 1 ruler.

Albert, Eugène Francis Charles d' (1864-1932), Fr. pianist and composer, b. Glasgow. He received the foundation of his musical education under Sullivan at the National Training School of Music in London, and studied also under Ernst Pauer, Stainer, and Prout. He won the Mendelssohn scholarship at 17, entitling him to a period of study abroad, which he spent at Vienna, afterwards studying under Liszt. As a pianist he soon became known in all parts of the world, and was for a short time court conductor in Weimar. He wrote 2 piano concertos, a symphony, and piano pieces. He married 7 times, among his wives being Teresa Carreño, the pianist (1892-5), and the singer Hermine Finck (1895-1910). He also composed many operas, including *The Ituby*, 1893; *Glismonda*, 1895; *Gernot*, 1897; *Die Abreise*, a one-act comedy, 1898; *The Improviser*, 1900; *Tiefland*, his most successful work, and part of the stock repertory of most Ger. theatres, 1903; *Fausto Solo*, musical comedy, 1905; *Tragaldabas*, 1907; *Lore's Chains*, 1912; *Dead Eyes*, 1916; *The Bull of Oliveira*, 1918; *Scirocco*, 1921; and *Mareike von Nymwegen*, 1923.

Albert: 1. Fr. tn (formerly **Ancre**) in the dept of Somme, 17 m. N.E. of Amiens, on the R. Ancre. In the First World War it was captured by the Germans during the great offensive they launched on 21 Mar. 1918; it was almost completely destroyed by the Ger. artillery. Rebuilt, it was again the scene of heavy fighting in 1940 and 1944. Machine-tools are manuf. Pop. 8800.

2. Riv. of Australia, crossing N. Queensland and falling into the Gulf of Carpentaria.

Albert, Lake (formerly **Albert Nyanza**) (native name, Mwutan Nzige), large lake partly in the Belgian Congo and partly in Uganda, situated in the lower basin of a great rift valley; it has an area of 2061 sq. m. The White Nile issues from the N. end of this lake, near the place where, on the E., the Victoria Nile enters, bringing the overflow of Lake Victoria. It is connected with Lake Edward to the S. by the Semliki R.

Albert Canal, Belgium, completed in 1939, links the R. Meuse at Liège with Antwerp and the R. Scheldt. Length 70 m.

Albert Edward Nyanza, see EDWARD, LAKE.

Albert Hall, London, large circular hall situated S. of Kensington Gardens, and within the City of Westminster, used for public meetings, concerts, oratorios, etc. Its seating capacity is over 10,000. It is situated opposite the Albert Memorial (q.v.), and its building was completed in 1871. It has one of the largest organs in the world.

Albert Medal, decoration given for gallantry in saving life, instituted by Queen Victoria in 1866, in commemoration of her late consort.

Albert Memorial, London, monument erected (1863-72) in memory of Albert, the prince consort, husband of Queen Victoria, in Kensington Gardens. It was designed by Sir Gilbert Scott.

Albert Park, national park in the Belgian Congo, gorilla and game sanctuary; situated in the Lake Kivu dist. Area 1,000,000 ac. Most of the inhab. are of pygmy race.

Albert the Bold (1443-1500), Duke of Saxony, spent much of his early life at the court of the emperor. He attempted to obtain the crown of Bohemia in 1471 on the death of George. In 1464 he and his brother Ernest ruled jointly the possessions of their father, but in 1485, by the treaty of Leipzig, a division was made, and Albert founded the Albertine branch of the Wettin family. He was a skilful soldier, and took part in a number of campaigns. He was made hereditary governor of Friesland in 1498 by the emperor, but while making good his title he d. at Emden.

Alberta, prov. of W. Canada, estab. with its present boundaries by the Dominion Parliament in 1905. It covers an area of 255,285 sq. m., and has a pop. of 939,500. Its S. limit is the U.S. boundary; on the E. 110° W. long. separates it from Saskatchewan; on the N. it is cut off from the NW. Ter. by 60° N. lat.; while on the W. the Rocky Mts separate it from Brit. Columbia. Except in the S., where irrigation is necessary, the prov. is well watered. Its 2 great rivs., the Athabasca and the Peace R., flow N. and NE. respectively until they meet the Slave R. coming from Lake Athabasca. The Slave R. then flows into the Great Slave Lake, whence, as the Mackenzie R., it drains into the Arctic Ocean. The Saskatchewan (N. and S. branches), with its tribs., drains the S. of A. into Lake Winnipeg, and thence, under the name of the Nelson R., into Hudson Bay. There are many small lakes, but Lake Athabasca and the Lesser Slave Lake are the 2 most important.

In the N. and SE. the country is level and sparsely wooded, in the S. and SW. near the Rocky Mts it is broken, hilly, and more wooded. The centre is well watered and timbered, and is the chief agric. dist. Wheat, oats, and barley are especially cultivated here, and mixed

farming is prosecuted with success. The chief industries, however, are ranching, stock raising, carried on particularly in the N., and oil production. Sugar-beet is extensively cultivated and much fruit is grown. The climate is on the whole healthful and invigorating. Since the prov. extends over 11° of lat. it naturally varies considerably, and these variations are accentuated by the various levels of the land. In the N. the cold is severe, but is moderated by the Chinook, a wind blowing from the Rocky Mts which melts

for years yielded some gold; there are large salt deposits in the N., and immense beds of tar sands in the dist. E. of Athabasca R. The mineral output was valued at approximately 196,000,000 dols. in 1952 and 323,740,702 dols. in 1956.

36.7 per cent of the pop. are engaged in agriculture (1951). It is estimated that there are about 68,000,000 ac. (43 per cent of total land area) of agric. land in A., of which, in 1951, about 22,271,044 ac. were under field crops. All the usual cereals are produced in large quantities, and



Alberta Government Photo

WATERTON LAKES, ALBERTA

the snow in a few hours. It is a moisture-bearing wind, and its influence is not entirely beneficial.

The prov. is rich in minerals. Great veins of both bituminous and anthracite coal have been found in A., and it is believed that over 25,000 sq. m. are underlaid with this mineral. Some 85 per cent of the coal resources of Canada are in A., and 25 per cent of those of all N. and S. America. Coal production, which in 1937 amounted to about 5½ million tons, and in 1952 to over 7 million tons, has declined (1955) to about 4½ million tons. But the discovery after the Second World War of huge reserves of petroleum and natural gas in the area around Edmonton (*see* LEDUC; REDWATER) has made this one of the most important areas for the production of mineral fuels on the N. Amer. continent. Before these discoveries the most important source of petroleum in A. was Turner valley (q.v.). The sands of the N. Saskatchewan R. have

alfalfa is also extensively cultivated. There is a large dairying industry. Important irrigation enterprises, which water an area of 847,000 ac. (1955), are operating at Calgary, Lethbridge, Bassano, and Medicine Hat. Mixed farming and dairying are features of the central section of the prov. The raising of horses, beef cattle, and hogs is also a feature.

Lumbering is a large industry in N. A. Spruce, pine, poplar, birch, larch, and Douglas fir are the chief timbers. The great lakes of N. A. are stocked with fish, especially whitefish and pike. Trout and pickerel are also abundant. Fur trading is still an important industry, with Edmonton as the centre.

Secondary industries, which mainly supply local needs, include abattoirs and meat-packing plants at Calgary and Edmonton. Flour- and saw-mills, brick-yards and tile-works, iron-works, harness factories, and stone quarries are located at many points.

Railway development has been rapid since 1900. The lines of the Canadian Pacific Railway run from Medicine Hat and from the E. through the Crow's Nest and Kicking Horse passes over the Rockies. The mts. are also crossed by the Canadian National Railways via the Yellowhead Pass. The main line of the C.P.R. runs E. and W. through Calgary, and from there are branches to Edmonton, and Macleod, with offshoots starting at Larcombe and Wetaskiwin. Two through lines of the C.N.R. connect Edmonton with Winnipeg, Port Arthur, and other centres in the E., and with Vancouver and Prince Rupert in the W. Canadian National lines also extend to Calgary

architect, sculptor, painter, musician, and man of letters, *b.* Genoa. He was for some time pontifical secretary at Rome. His best work is generally held to be the church of San Francesco at Rimini. He also designed the church of Sant' Andrea, Mantua, and Santa Maria Novella (façade) in Florence, and the Palazzo Rucellai, Florence. He was one of the pioneers in reviving classic architecture. He wrote works on the theory of painting and statuary, but his great work is the *De re aedificatoria*, printed 1485. See biographies by Mancini, Florence, 1882; Landi, Florence, 1906; Ricci, Turin, 1917; Venturi, Rome, 1923; Semprini, Milan, 1927.



Alberta Government Photo

EROSION EFFECTS NEAR DRUMHELLER, ALBERTA

from E. and N., and there are also extensions westward into the coal-fields.

A., as other prairie provs., was severely hit by the economic depression of 1930-1932, and for years afterwards the people of the prov. were far from their previous degree of prosperity. This no doubt was partly due to over-cultivation of wheat and the impoverishment of the soil. See also ABERHART, WILLIAM.

The gov. is vested in a Lieutenant-governor, an Executive Council of 13 members, and a Legislative Assembly of 61 members elected for 5 years.

Cap. Edmonton; chief tns: Calgary, Lethbridge, Medicine Hat, Camrose, Athabasca, Drumheller, Peace River, Stettin, Wetaskiwin, Red Deer. See L. Thwaite, *The Province of Alberta*, 1912; A. D. MacRae, *History of Alberta*, 1912; J. Blue, *The Province of Alberta*, 1924; A. L. Burt, *The Romance of the Prairie Provinces*, 1930; and Bureau of Statistics (Dept of Industries and Labour), Gov. of Alberta, *Alberta—Facts and Figures*, 1954.

Alberti, Leone Battista (1404-72). It.

Albertinelli, Mariotto (1474-1515). It. painter, *b.* Florence. He was the pupil of Cosimo Rosselli, and fellow student with Fra Bartolommeo, with whom he collaborated in sev. works. Among his famous paintings may be named a 'Visitation' at the Uffizi in Florence and a 'Virgin and Child' in the Louvre.

Albertite, carbonaceous mineral found in Albert co., New Brunswick. It is soft, and a shiny jet-black in colour.

Albertus Magnus (1193 or perhaps 1206-80), one of the greatest scholastic philosophers of the Middle Ages, and known as *Doctor Universalis*. He studied science at Padua, entered the Dominican order about 1222, and taught theology at Ratisbon, Strasburg, Cologne, and Paris (1245). His works occupy 21 folio vols. in the ed. of Jammy (1651). St. Thomas Aquinas was his pupil. His erudition was so extraordinary for the time as to comprise a very considerable knowledge of Arabian and Rabbinical literature. In natural science he followed Aristotle and Avicenna, agreeing

with the latter over the impossibility of genuine metallic transmutation. See H. Wilms, *Albert the Great* (trans.), 1933.

Albertville: 1. Cap. of a dist. in the Belgian Congo at the end of the railway from Kabalo (Upper Congo); situated on the W. shore of Lake Tanganyika; connected with the E. coast by the railway Kigoma-Dar-es-Salaam. White pop. 953.

2. Fr. tn, cap. of an arron., in the dept of Savoie, on the Arly. It has saw-mills, and manufs. furniture and food-stuffs. Pop. 7100.

Alberus, Erasmus (1500-53), Ger. reformer and man of letters, b. Spremlingen near Frankfurt. He went to Wittenberg in order to study theology, and there met Luther, whose cause he soon espoused. His chief weapon in defence of Lutheranism was literary satire. He also wrote hymns, some of which are still to be found in the Ger. Protestant Hymnal, but his memory is preserved chiefly by his fables, *Buch von der Tugend und Weisheit*, 1550.

Albi (Lat. *Albiga*), Fr. tn, cap of the dept of Tarn, on the Tarn. It is the tn from which the Albigenes (q.v.) took their name. The seat of an archbishopric, it has a magnificent cathedral, the most noteworthy example of S. Gothic architecture, and also a splendid, fortified archiepiscopal palace, now a museum. It has textile, glass, cement, and machinery manufs., an agric. market, and is known for its *foie gras truffé*. Toulouse-Lautrec (q.v.) was b. here. Pop. 34,300.

Albica, see ALBI.

Albigenses, branch of the Cathari (q.v.) who multiplied in the S. of France in the 12th cent.; so named from Albi, the tn in Languedoc where a council condemned them in 1176. They were again condemned at the Lateran Council in 1179; but this and the pacific measures of Innocent III only increased their resistance, which led to the Albigensian Crusade. The latter, led by Simon de Montfort, virtually exterminated the heresy. See Daniel-Rops, *Cathedral and Crusade*, 1957.

Albinism, condition of the skin, hair, and eyes in which there is a congenital absence of pigment. Albino is the name given to a person suffering from this defect. A. may be partial, when there are irregularly shaped white patches on the skin or hair, or complete, when the entire surface is unpigmented, including the hair and the choroid coats and irises of the eyes. The irises appear pink because in the absence of pigment the transparency of the iris and retina allows the blood in the small veins of the eyeball to show through. This transparency of the iris constitutes a disability in sunlight, so that albinos usually pucker up their eyes and are often short-sighted or affected with mytaloopia (q.v.); at night, however, their sight is better than normal, owing to the greater amount of light reaching the retina. A. occurs in all races of human beings, but particularly among Negroes, whose race also shows a partial A. in which the black skin has white patches. It also occurs in

nearly all classes of the animal kingdom, particularly among mammals. In some cases the A. is periodic and is restricted to the winter months, so that it enables animals in snow-covered countries either to approach their prey or to escape detection by their enemies; notable examples are the arctic fox and arctic hare. A. is partially hereditary, and occurs periodically in accordance with a regular system, which has been investigated by Mendel and others. The phenomenon also occurs among plants.

Albinoni, Tommaso (1671-1750), It. composer, b. Venice. He was wealthy and never held a musical appointment, but was a fully trained musician. He wrote operas and instrumental music; three of his works were transcribed by Bach for clavier and for organ.

Albintimilium, see VENTIMIGLIA.

Albinus, Bernhard Siegfried (1697-1770), Ger. anatomist, b. Frankfurt-on-Oder. He qualified in medicine at Leyden (1719) and two years later was appointed prof. of anatomy there, a post he held for 50 years. His anatomical works are noted for their accuracy and beauty of illustration. A. was an incomparable lecturer and a master of the technique of anatomical injection. His chief works are *Historia musculorum hominis*, 1734, *De arteriis et venis intestinorum hominis*, 1736, *Tabuli selecti et musculorum corporis humani*, 1747, and *Tabuli ossium humanorum*, 1753. See T. J. Pettigrew, *Medical Portrait Gallery*, vol. i, 1840.

Albinus, Decimus Clodius (d. AD 197), Rom. soldier, b. Adrumetum in Africa. He entered the army at an early age, and served with distinction under Marcus Aurelius, especially during the rebellion of Avidius Cassius, AD 175. He was raised to the consulate in 176, and appointed to the governorship of Gaul and afterwards of Britain by the Emperor Commodus. On the death of Commodus and that of his successor, Pertinax, 193, Septimius Severus declared A. Caesar, in order to secure his neutrality, while he himself marched on Rome. Having there defeated his rival Pescennius Niger, he resolved to get rid of A. also. In a battle at Lugdunum (Lyons) A. was defeated and killed.

Albion, anct. name of Britain among Greeks and Romans. The name is perhaps of Celtic origin, but the Romans took it as connected with *albus* (white), referring to Dover cliffs.

Albion, New: 1. Name given by Sir Francis Drake to the dist. of Lower California, in N. America, which he visited in 1579. Later geographers, led by Humboldt, restricted the name to the dist. which Drake actually explored, between San Francisco Bay and the Columbia R.

2. Alleged royal grant of land to the Ploverden family, 1634. This ter. was the present New Jersey, with Long Island, and the region from New York to Virginia.

Albite, silicate of soda and aluminium belonging to the feldspar group. Its colour is pure white, whence its name

(Lat. *albus*), and thus it can be distinguished from true felspar, with which it often occurs. It forms a constituent of granite, and many crystalline rocks of primary or secondary origin. Several varieties of A. are distinguished, e.g. pericline.

Albium Ingaunum, see ALBENGA.

Alboin (d. probably 573). King of the Lombards, succeeded his father about the year AD 565. At this time the Lombards were living in Noricum and Pannonia. In alliance with the Avars, A. overcame the Gepidae, whose king he killed. He then married Rosamund, the daughter of the dead king. About 568 he invaded Italy, meeting with practically no resistance save at Pavia, which held out for about 3 years. During the siege he overran a great deal of N. Italy, ruling over the whole of Venetia, Lombardy, Tuscany, and Piedmont. In 572 or 573 he was murdered by his wife's lover Longinus, who was instigated to the crime by Rosamund, whom the king had insulted by forcing her to drink from the wine-cup made from her dead father's skull.

Alboni, Marietta (1826-94), celebrated lt. contralto opera-singer, b. Città di Castello. She was trained under Rossini. Her first appearance, in 1842, in Pacini's *Saffo* at Bologna, was followed by brilliant successes throughout Europe and the U.S.A.

Alborak (Arabic *al-burak*, connected with *barak*, lightning, for its brightness or its swiftness), animal like a mule which was the mount of the angel Gabriel; it was lent to Abraham to visit his son Ismael (Ishmael) in Mecca, and on it Mohammad ascended to heaven on the Night Journey. It is pictured with wings and a human head.

Albornoz, Gil Alvarez Carillo (1310-67), cardinal, b. Cuenca, nominated Archbishop of Toledo in 1337 by Alfonso XI. He fought against the Moors, but later went to Pope Clement VI at Avignon, some say in flight from Pedro the Cruel. In 1350 this pope made him a cardinal, and in 1353 Innocent VI sent him as legate into Italy to negotiate the restoration of the Church's temporal power. This he did, with the help of Rienzi (q.v.).

Albrechtsberger, Johann Georg (1736-1809), Austrian composer, theorist, and teacher, b. Klosterneuburg, near Vienna. Among his pupils was Beethoven, to whom he gave lessons in counterpoint.

Albret, Lebret, or Labrit, ancient lordship of France, in Gascony (q.v.). The château d'A. belonged to one of the most powerful Fr. medieval families, many members of which espoused the Eng. cause in the Hundred Years War (q.v.). The mother of Henry IV of France (q.v.) was a member of this family.

Albright (Albrecht), Jacob (1759-1808), Amer. clergyman, b. near Pottstown, Pennsylvania. Converted to Methodism in 1790, he preached that faith among the Pennsylvania Germans and was the founder of the Evangelical Church (q.v.).

Albright, William Foxwell (1891-), Amer. oriental archaeologist. From 1919 to 1936 he was Director of the Amer.

School of Oriental Research in Jerusalem, where he undertook many important archaeological expeditions into Palestine and the surrounding countries. Now Spence Prof. of Semitic Languages in the John Hopkins Univ. His important publs. include *Excavation of Tel Beit Mirsim*, 1932-43, *Archaeology of Palestine*, 1932 and later eds., and *From the Stone Age to Christianity*, 1940 and later eds.

Albrizzi, Isabel Theotoki, Countess of (1763-1836), b. Corfu, d. Venice. She was universally admired for her talent, wit, and beauty, which brought her into contact with the most famous literary men of her day; Byron called her the Mme de Staël of Venice. She is chiefly remembered for *Ritratti*, 1807, a series of portraits of famous lt. contemporaries, and for critical essays on plastic art.

Albucasis, see ABULCASIS.

Albuera, La, Sp. vil. in the prov. of Badajoz, 13 m. SE. of Badajoz tn. The French were defeated here in 1811 by a Brit., Sp., and Portuguese army (see PENINSULAR WAR). Pop. 2000.

Albuferra, Duc d', see SUCHET, LOUIS GABRIEL.

Albufera, La, large freshwater lake in the prov. of Valencia, Spain, separated from the sea by a pine forest. It abounds in wildfowl and fish, and its revenues were given to the Duke of Wellington. The English were defeated by Suchet (q.v.) near by in 1812.

Albula Pass, in the Grisons, Switzerland, connects the valleys of the Rhine and Inn. A railroad was completed across it in 1903, making the shortest route into the Upper Engadine. Highest point 7590 ft.

Album (Lat. *albus*, white), board (exposed in some public place such as the Forum), plastered or painted white, on which, in ancient Rome, were inscribed public edicts and announcements. The name was extended to include the *Annales* of the pontifex maximus, the list of decessions, of jurors, etc. In modern times the name is applied to a note-book in which verses, sketches, or autographs may be collected, or the larger books in which photographs are kept. In the Middle Ages any register or catalogue of saints, civil functionaries, etc., was called an A. On the Continent the term is now applied to the list of members of a univ.

Albumazar (Abu-Maaschar), Arab writer on astronomy or natural astrology, b. at Balkh c. AD 805, wrote *De Magnis Conjunctionibus*, *Introductorium in Astronomiam*, and *Flores Astrologiae*. He held that the world was created when the 7 planets were in conjunction in the first degree of Aries, and will end with a similar conjunction in the last degree of Pisces.

Albumen, in plants, is the nutritive tissue used by the developing embryo in a seed. It is not the same as animal A.; the name was applied only by analogy, and the botanical name for it is *endosperm* (q.v.). Plants are said to be *albuminous* (e.g. ash) or *exalbuminous* (e.g. pea).

Albumin, term applied to a group of organic bodies of very complex structure.

The chemical investigation and classification of these compounds is a matter of great difficulty, but there are certain important properties which are characteristic of the group generally. They contain 5 elements, the proportions of which do not greatly vary in the different members of the group: carbon, from 50 to 55 per cent; hydrogen, from 6.5 to 7.3 per cent; nitrogen, from 15 to 17.6 per cent; oxygen, from 19 to 24 per cent; sulphur, from 0.3 to 5 per cent.

A.s are colloidal substances, i.e. they do not pass through parchment paper, and advantage is taken of this property to separate them from salts in solution. The addition of alcohol to the aqueous solution precipitates the A., and boiling with water produces coagulation. Different A.s coagulate at different temps., and after coagulation all A.s are insoluble in water and can only be made to dissolve by being treated with caustic alkalis or mineral acids.

The A.s proper and the allied compounds are of great importance physiologically. With the exception of fats and mineral salts all the dry material of animal bodies is made up of albuminous substances, or proteins as they are sometimes called, according to the classification adopted. They are an essential part of every plant cell, and they form an indispensable constituent of human and animal food. The body can exist for a long time without fats or carbohydrates, but death is inevitable on the withdrawal of proteins from its nourishment. The chief proteins found in food substances are egg A. in white of egg, fibrinogen and haemoglobin in blood, myosin in meat, caseinogen in milk, casein in cheese, and gluten in flour. In the process of digestion (q.v.) proteins are split up into peptides, and these again into amino-acids. The products of digestion go mainly to the bloodstream for the building up or repair of the tissues.

Egg Albumin, or white of egg, is used as an antidote to poisoning by corrosive sublimate, sugar of lead, and copper sulphate, as it forms insoluble compounds with those substances. It is also used in the refining of sugar and for fixing light shades in the colour printing of textiles.

Albuminoids, term of doubtful application. It is sometimes used as a generic term to denote those substances which resemble egg albumin, such as myosin, casein, globulin, fibrin, and gluten. In histology the term has another use, denoting the substances composing the connective tissues, as collagen, keratin, fibroin, elastin, etc.

Albuminuria, presence of albumin in the urine. The immediate cause is the escape of the blood albumins from the blood-vessels into the renal tubules. There may be definite lesions of the kidney of an acute or chronic inflammatory nature. The most common of these is nephritis (q.v.). A. also occurs in toxæmia of pregnancy (see PREGNANCY). Accidental or spurious A. is due to the presence of blood or pus from hæmorrhage or disease of the ureters, bladder,

or urethra. Febrile A. is a condition accompanying many fevers and rarely lasts longer than the fever. Cyclic A. derives its name from the periodic appearance and absence of albumin in the urine. The albuminuric paroxysms are generally absent at night, and appear to be the result of the assumption of the upright posture. The simplest test is coagulation of the albumin by boiling. A test-tube is filled about two-thirds full of filtered urine, a little acetic acid added, and the upper part of the column of urine carefully heated. Any turbidity that appears can be at once detected by comparison with the lower part of the column, and may be due to albumin or phosphates. If it is due to albumin, adding nitric acid will increase the turbidity; if to phosphates, the liquid will be cleared at once. A peculiar protein, known as Bence Jones's protein, is found in the urine in certain affections of the bone marrow. If on heating urine a cloud appears well below boiling-point, disappears on further heating, and then reappears on cooling. Bence Jones's protein is present.

Albuquerque, Alfonso d., surnamed the Great (1453-1515), founder of the Portuguese power in the E., was b. near Lisbon and spent his youth at the court of Alfonso V. Being made viceroy of the Portuguese Indies, he took Goa, 1510, and then in rapid succession Malabar, Ceylon, Malacca, 1511, and later Ormuz, 1515. His rule was wise, firm, and humane. In 1515 Emmanuel recalled him, putting his personal enemy, Lopes Soares, in his place. He d. at Goa. See *Commentarios do Grande Afonso Dalboquerque* (Lisbon, 1557), written by his son; trans. pub. by Hakluyt Society, 1875-84.

Albuquerque: 1. Sp. tn in the prov. of Badajoz, near the Portuguese frontier. It has textile manufs. Pop. 10,500.

2. Co. seat of Bernalillo co., New Mexico, U.S.A., on the Rio Grande, and at the junction of the Atchison, Topeka & Santa Fe and Pacific railroads. The largest city in the state, it is a centre of an agric., livestock, and coal-mining region. Food processing, fruit canning, and lumber milling are important, and it manufs. metal appliances, wood fixtures, tiles, cement, and bricks. There is also Indian handicraft. A. is the seat of the univ. of New Mexico, the Catholic Teachers' College of New Mexico, the U.S. Indian School, and the United Pueblos Agency. Kirtland Air Force Base and Sardia Base (guided missiles station) are here. It is the H.Q. of Cibola National Forest. Pop. 96,815.

Alburnum, or **Sapwood**, youngest wood of a tree, lying immediately below the bark, in distinction to the heart-wood or *Duramen* (q.v.), which is the hardened older wood.

Albury, tn in New S. Wales, Australia, at the head of the navigation of the Murray R., from the mouth of which it is 1368 m. distant. It is 399 m. SW. of Sydney by rail. A. is the centre of an important rural dist. Pop. 17,100.

Alcaeus (late 7th-early 6th-cent. BC),

b. Mityleno. Of aristocratic birth, he was yet a fiery democrat, and vigorously opposed both the tyrant Myrsilus and the popular ruler Pittacus. He wrote odes in the Aeolic dialect, using the measure which bears his name. Fragments to be found in E. Lobel, *Alcaei fragmenta*, 1927. The Alcaic was a favourite metre with Horace, and has been imitated by Tennyson in 'O mighty-mouth'd inventor of harmonies. . .'. See C. M. Bowra, *Greek Lyric Poetry*, 1936.

Alcahest, or **Alkahest**, term introduced into alchemy by Paracelsus to denote the unknown 'quintessence' of creation, the one real elementary form of matter. He considered this to be the universal solvent that the alchemists sought.

Alcaide, or **Alcaide** (Arabic *al kayid*, the head, or leader), Sp. word formerly used to denote the governor of a fortress or a castle, a jailer or a warden.

Alcalá de Guadaira, Sp. tn in the prov. of Sevilla, on the Guadaira. It has a Moorish castle, and is known for its bread. Pop. 25,000.

Alcalá de Henares (Rom. *Complutum*), Sp. tn in the prov. of Madrid, on the Henares. Its famous univ., founded by Cardinal Ximenes (q.v.) in 1510, was removed to Madrid in 1836. Here was printed in 1517 the first polyglot (q.v.) Bible. Before 1836 A. had 38 churches, 21 convents, 27 other religious institutions, and 21 univ. colleges. Cervantes (q.v.) was b. here. Pop. 21,000.

Alcalá la Real, Sp. tn in the prov. of Jaén. The French defeated the Spaniards here in 1810, during the Peninsular War. There is a trade in cereals, fruit, and wine. Pop. 26,000.

Alcaide (Sp., from Arabic *al caidi*, the judge), general title for a judicial officer in Spain and parts of America settled by the Spaniards.

Alcámenes, famous Athenian sculptor of the end of the 5th cent. BC, possibly a pupil of Phidias. He is known by a 'Hephaestus' and an 'Aphrodite,' and it is likely that he worked on the Parthenon.

Alcamo, **Cielo D'**, see **CIELO**.

Alcamo, tn in Sicily (q.v.), at the foot of Mt Boniface, 24 m. ESE. of Trapani (q.v.). It has many relics of the Saracens (q.v.), who possessed the tn until 1233. There are mineral springs, and a trade in wine and fruit. Cielo Dalcamo (see **CIELO**) was b. here. Pop. 40,900.

Alcañiz, Sp. tn in the prov. of Teruel, on the Guadalupe. It has many ant. buildings, including a 12th-cent. Templars' castle. It is an important centre for bituminous coal. Pop. 10,000.

Alcántara, **Dom Pedro De**, see **PEDRO I and II**.

Alcántara, **Knights of**, founded as the order of St Julian, formed a military and monastic order for the defence of Spain against the Moors. The order was founded in 1156 and approved by Pope Alexander III in 1177. In 1835 it was changed from an eccles. to a court order.

Alcántara (Arabic 'the bridge'), Sp. tn in the prov. of Cáceres, on a rocky height above the Tagus. The ruins of the convent of the Knights of A. (q.v.) remain,

as do the ruins of the castle in which the order was founded. The magnificent six-arched Rom. bridge (870 ft long, 131 ft high), built in AD 105, has been much damaged, but the greater part is still intact. Pop. 4200.

Alcazar, Sp. tn in the prov. of Albacete, on the slopes of the A. mts. It has the remains of a Rom. aqueduct, and an ant. castle, and is in a copper and zinc mining area. Pop. 5800.

Alcarria, **La**, fertile dist. in the Sp. prov. of Guadalajara. Its mkt tn is Brihuega, which has ant. walls and fine churches and mansions.

Alcaudete, Sp. tn in the prov. of Jaén. Pop. 16,300.

Alcaide, see **ALCAIDE**.

Alcázar, name of sev. palaces of the Moors in Spain, the most important of which are the two A.s of Cordova—the 'A. viejo' built by the Arabs, and the 'A. nuevo' built by Alfonso XI. The A. of Segovia contained many art treasures, statues, and historical relics. It was, however, destroyed by fire in 1862. The A. of Seville was built by the Arabs in the 12th cent., and has been enlarged sev. times, presenting a mixture of oriental and Gothic architecture. It contains many valuable curios. Toledo had 5 A.s. of which the most beautiful was destroyed by fire in 1710, and that of Alfonso VIII has been converted into a monastery.

Alcázar de San Juan, Sp. tn in the prov. of Ciudad Real, in the plain of La Mancha (q.v.). It is believed to be the ant. tn of Alces, and has a large wine trade. Pop. 26,500.

Alcazar-kebir, city of Morocco, an important caravan centre. Here, in 1578, Sebastian of Portugal was defeated and slain by the Moors.

Alcedo, genus of kingfishers which belongs to the family Alcedinidae, and is allied to the hoopoes and hornbills. *A. althis* is the European species of kingfisher.

Alces, see **ALCAZAR DE SAN JUAN**.

Alcestis, daughter of Pelias and Anaxibia, and wife of Admetus, who won her by Apollo's aid. When her husband was about to die she offered her life for his, but was eventually brought back from the lower world by Heracles. See the *Alcestis* of Euripides.

Alchemilla, family Rosaceae, genus of about 200 perennial herbs of N. temperate regions and mts of tropical Africa. *A. vulgaris*, with broadly lobed leaves, and yellowish-green flowers in racemes, is Lady's Mantle; *A. alpina*, Alpine Lady's Mantle, and other species are found in Britain.

Alchemy, usually associated with the magic arts and with astrology, but in reality the beginning of our systematic chem. The origin of the word is variously given, being derived from the Gk and from the ant. Egyptian, via Arabic. The art probably had its origin in Egypt, since Egypt possessed a civilisation and culture far in advance of those of any contemporary nation. It is therefore not surprising to learn that the earliest mention of A. is to be found in the records of

the Egyptians. Legend after legend grew up and was perpetuated in some way or other by writings regarding the origin of this very mystical science. The origin is variously attributed to Hermes Trismegistus ('the thrice greatest'), to the fallen angels of the Book of Genesis (vi), and yet again by revelation to Moses and Aaron. The origin through Hermes is the one which was most generally accepted, and also the one which has affected chemical language down to the present day (cf. 'hermetically sealed'). He was the Egyptian ideal of personified strength, the great god Thoth, and his divine art of A. was a secret revealed only to a sacred school of the sons of kings. Astrology and magic were the accompanying sciences of A., and that whole science was based upon the transmutation of metals, which seems from the researches of Berthelot, in his study of the 3rd cent. AD Leyden papyrus (found in Thebes in the 19th cent.), to have undoubtedly originated in Egypt. During the 4th and 5th cents. the writings of the alchemists continued increasing until by the end of the 5th cent. we may say that speculative A. had reached its highest point in the Alexandrian schools. The results of the appearance of the Muslims in the civilised world did not at first promise to further the arts and sciences, but within a short time of their appearance the Muslim schools began to become famous, and the names of many Arabs and Persians are among the most notable of the alchemists. The most famous of these Muslim alchemists was Jabir ibn Hayyan, known to the W. of Europe as Geber. His name is bound up with the chemical knowledge of the time, but much that has been attributed to him has been found to be spurious, and many of his so-called writings are writings of a much later date. His own ideas were very similar to those of the old Alexandrian philosophers, and he believed even in the influence of the planets on metals.

The theory of transmutation, although modified to a certain extent by the later alchemists, can be traced quite easily in the writings of the Gk philosophers. All substances were ultimately composed of one elemental matter, and so the alchemist hoped to be able by the removal of all the foreign matter to obtain the *materia prima*. This theory of A. still existed amongst the alchemists of the Middle Ages; that they believed in it as firmly as did the ancients cannot perhaps be definitely stated. Men such as Albertus Magnus, Roger Bacon, Arnold of Ville-neuve (q.v.), and Vincent of Beauvais all held these beliefs. Roger Bacon, to quote only one example of this period, believed in the philosophers' stone, which was to turn the baser metals into gold, and also in the elixir of life. When it is remembered that numerous ideas of Roger Bacon were far beyond his time, it will be seen that the alchemistic ideas had a very strong hold indeed. Even down to almost modern times, certainly well into the 17th cent., these alchemistic ideas were still held, at any rate from the

academic point of view, by the chemists of the period. Among them may be mentioned (Glauber (1603-68), Robert Boyle (1627-91), and for some time Newton and Leibnitz, and even Dr Johnson, who was interested in chem. The science has been adhered to by some right down to the present cent., and recent alleged successful transmutations have been reported from Armenia and France. With the 20th cent. and the research into radio-activity, artificial transmutation of certain elements has been accomplished on a small scale. The views of the alchemist certainly do not receive support here, but the essential principle underlying all the experiments of A. seems to have received some little encouragement. See also ALBERTUS MAGNUS and TRANSMUTATION OF THE ELEMENTS. See A. E. Waite, *Lives of the Alchemists*, 1888; M. Berthelot, *La Chimie au moyen âge*, 1893; E. O. von Lippmann, *Die Entstehung und Ausbreitung der Alchemie*, 1919; E. J. Holmyard, *Makers of Chemistry*, 1931, and *Alchemy*, 1957; J. Read, *Prelude to Chemistry*, 1936, and *The Alchemist in Life, Literature, and Art*, 1948; K. K. Doberer, *The Goldmakers*, 1948.

Alchevsk, see VOROSHILOVSK.

Alciati, Andrea (1492-1550), It. jurist and poet, b. Milan, d. Pavia. He was prof. of civil law at Avignon, Pavia, and Ferrara. His refined legal criticisms make him founder of the 'elegant' school of law. He wrote commentaries on the Pandects and on the Justinian code. His criticisms of Rom. law were of a revolutionary nature. His collection of moral sayings in Lat. verse called *Emblems* (*Emblematum Libellus*) is famous.

Alcibiades (c. 450-404 BC), b. Athens and connected through his mother with the house of the Alcmaeonidae. He was left an orphan at a very early age, and this lack of proper control during his youth probably accounts for some of his later excesses. Socrates, who saved his life at Potidaea, and whose life he saved at Delium, obtained some influence over him and tried to eradicate his vices, but with very little effect. After the battle of Delium, 424 BC, he married Hipparche, and at this time he began to turn his attention to public affairs. He wished to ally himself with the Spartans, but on their choosing his rival Nicias to negotiate for them in 421 BC he immediately became their enemy. Instead of taking part in the Sicilian expedition of 415, he again joined them, escaping to their country because he was accused of the mutilation of the images of Hermes. He now became the enemy of the Athenians; but he soon forsook the cause of the Spartans and tried to get the Athenians to recall him, promising them an alliance with Tissaphernes, the Persian satrap. This plan was not successful, but he was eventually recalled to Athens by Thrasybulus. In 407 BC, on his return to that city, he was completely restored to his former position, but had his command taken from him the next year. He then chose exile as his only means of safety, and in 404 BC he went to take refuge with Pharnabazus, wishing to go thence to the court of

Artaxerxes. He was revolted from doing so, however, for he was there the house he was staying was set on fire. In trying to escape the flames he rushed out to fall pierced by arrows shot by emissaries of the Persians. See F. Taeger, *Alcibiades*, 1943.

Alcidae, the auks, belong to the Charadriiformes, and are all to sea-gulls. They have webbed feet and fly well. They live on rocks, lay single eggs, and feed on fish and crustaceans. *Pinguinus impennis*, the great auk, was extinct, had short, useless wings; *Alca* is the razor-bill; *Fratercula arctica* is the puffin.

Aloides, see HERCULES.

Aloinous, king of the Thracians, in the is. of Scheria, son of Ausithous and grandson of Poseidon. Books vi to xii of the *Odyssey* tell of his reception and entertainment of Ulysses, who an outcast on the shore of the is. was saved by A.'s daughter, Nausicaa. See also ARGONAUTS.

Alciphron (2nd-3rd cent.), Greek writer of prose epistles. These consist of four groups: letters from fishermen, farmers, parasites, and courtesans. The scenes are laid in 4th-cent. Athens; style is vivid and graceful, though somewhat artificial. See M. A. Schepers, *Alciphron's Iktoris Epistularum libri IV*, 1906; there is an Eng. trans. by F. A. Wrigth 1923.

Alcira, Sp. in the prov. Valencia, believed to be on the site of Rom. town of Saetabula. It has a 14th-cent. bridge, a Gothic church, and several old mansions. It is the centre of a rich orange-growing district. Pop. 25,250.

Alcloyd, see STRATHCLYDE.

Alomaeon, son of Amphias and Eriphyle, and brother of Amphius, fought with the Epigoni against Thebes. Amphiaras also participated at the cost of his life, having been induced to do so by Eriphyle against his promise of misfortune. To avenge his father's death Amphiaras enjoined his sons to kill his mother. A. did so on his return home and was pursued by the Furies in sequence. He was cured of his first madness by the King of Psophis, whose daughter Arsinoë he married, and of his second by the river-god Achelous, whose daughter Callirhoë he also married. His army was discovered by Arsinoë's father, whose sons murdered him.

Alomaeonidae, noble family Athens, who were driven out by Pylus Iessenia by the Dorians, and settled Athens. Owing to the way in which Mages, one of the family, treated the insurrection under Cylon (612 BC), they brought upon themselves the guilt of sacrilege and were exiled from Athens, c. 595. About 10 years they returned, but were again expelled by Pisistratus. In 548 they agreed to the Amphictyonic council to rebuild the temple of Delphi, and won great popularity throughout Greece by cutting the work in a style of grandeur much exceeding their obligations under the agreement. On the expulsion of the tyrants in 510 they were again restored to Athens. They now joined the popular party, and Clisthenes, who was then the head of the

family, gave a new constitution to Athens.

Aloman (7th cent. BC), Greek lyric poet; b. Messos, he made his home in Sparta. Fragments of his work survive, most of them from choral songs. See E. Diehl, *Anthologia Lyrica Graeca*, 1949; D. L. Page, *Alcman*, 1951.

Alcock, John (c. 1430-1500), English bishop. He was successively Bishop of Rochester, 1472; Worcester, 1476; Ely, 1486. He was the founder of Jesus College, Cambridge (1496).

Alcock, Sir John William (1892-1919), British airman who, with Sir Arthur Whitten-Brown, made the first direct transatlantic flight in 1919 (see ATLANTIC FLIGHTS), but subsequently lost his life on a flight to France.

Alcoforado, Mariana (1640-1723), nun of Beja in Portugal to whom has been erroneously attributed the authorship of the famous *Lettres portugaises*, 1669, a series of passionate love-letters written to a young French officer who was wrongly identified as Noël Bouton, afterwards Marquis de Chamilly and Marshal of France. The responsibility for this mystification rests with Barbin, the publisher, and Lavergne de Guilleragues, an impudently nobleman of small literary gifts. See F. C. Green, *Who was the Author of the 'Lettres Portugaises'?* (Modern Language Review), 1926, and Gonçalves Rodrigues, *Mariana Alcoforado*, 1935.

Alcofrabas Nasier, see LABELAIS.

Alcohol, term applied to a group of organic substances which may be regarded as derived from the hydrocarbons by the substitution of one or more univalent hydroxyl groups OH for the same number of atoms of hydrogen. The name A. is, however, usually applied to one member of that group, ethyl A., which is present in varying quantities in wine, beer, spirits, etc.

The aliphatic A. series contains methyl, ethyl, propyl, butyl, amyl, hexyl A.s, etc., and their isomerides. The lower A.s. from methyl A. to butyl A., are mobile liquids, the middle A.s. are oily liquids, and the upper A.s. are waxy solids. The lower A.s. have a characteristic spirituous smell which becomes disagreeable higher up in the series. The most important members are methyl A. and ethyl A.

Methyl alcohol or **methanol** (CH₃OH) is produced in the dry distillation of wood. The aqueous product of the distillation contains about 1 to 2 per cent of methyl A., which can be separated by fractional distillation after the removal of the acetic acid by hot milk of lime. Methyl A. is used in the preparation of aniline dyes and for the denaturation of ethyl A. It is now prepared synthetically, on a large scale, from carbon monoxide and hydrogen, which are made to react under pressure, at 450° C., in the presence of metallic oxides; the latter acts as catalysts.

Ethyl alcohol or **ethanol** (C₂H₅OH) has been known from the earliest times as produced in the fermentation of grape juice. When pure it is a mobile colourless liquid with a characteristic odour. It solidifies at about -130° C., hence its use in thermometers intended to register

low temps. It is miscible with water in all proportions, and burns with a pale blue non-luminous flame. In the laboratory it may be prepared by converting ethane into ethyl chloride and heating the latter with dilute alkalis under pressure. A. is always prepared for commercial purposes by making use of the process of fermentation (q.v.). Dextrose, or grape-sugar, decomposes in the presence of yeast-cells into A. and carbon dioxide, and the dextrose is obtained by making a pulp of any starchy material, such as potato, grain, rice, etc. By enzymes (see FERMENTATION) the starch is almost completely turned into maltose, which by combining with water is converted into dextrose. The weak solution of A. thus obtained is subjected to fractional distillation. The distillate or 'raw spirit' contains 'fusel oil,' which is contained in the higher boiling-point fractions. To eliminate the fusel oil, the raw spirit is diluted with water and filtered through charcoal, which absorbs some of the fusel oil. The filtrate is again distilled and collected in 3 fractions, that of the lowest boiling-point being fairly pure A. For most purposes it is unnecessary to get rid of the fusel oil; even beer and whisky contain a small quantity of this substance, which is supposed by some to improve the flavour; it is, however, undoubtedly injurious to health.

In the Brit. Isles a heavy excise duty is levied on 'spirits of wine,' but the Gov. allows certain exceptions in order not to hamper the various industries in which A. is used. Methylated spirit contains 10 per cent of partially purified wood-spirit and a small proportion of paraffin oil, which render it undrinkable. It is also coloured with an aniline dye. This spirit is sold duty free, and in cases where the paraffin oil would militate against certain manufacturing processes, the spirit may be supplied to manufacturers denatured with wood-spirit only. For laboratory purposes in univs. and colleges the sale of pure A. is allowed free of duty. Ethyl A. completely free from water and other impurities is known in chem. as 'absolute' A.

The great solvent powers of A. have made it of much importance in the preparation of lacquers, varnishes, and dyes. It is used also for the manuf. of chloroform, chloral, and iodoform, and as a fuel. Its solvent power also makes it valuable in the chemical laboratory, and it is used too for the preservation of anatomical specimens.

The most important fact in connection with A. is the part it plays in the preparation of alcoholic liquors. A vast mass of legislation and of administrative detail, great industries like brewing and distilling, and social and hygiene problems are all cognate to this subject. See BREWING; DISTILLING; DRUNKENNESS; EXCISE; LICENCE.

Alcoholic liquors may be divided into 2 classes: those which are distilled and therefore contain a large proportion of A., and those which are the result of

fermentation without distillation, and therefore depend their flavour mainly on the medium in which the fermentation takes place. One distilled liquor the chief are brandy (q.v.), distilled from wine; whisky (q.v.), from a fermented solution of malt; rum (q.v.), from a fermented solution of sugar; and gin (q.v.), from a fermented solution of malt, but flavoured with juniper. Those not distilled comprise (see under BREWING), which is fermented malt solution flavoured with hops, and wine (q.v.), which is fermented grape juice. Beer, with its modifications, but, porter, and the various kinds of ales, usually contains from 3 to 7 per cent of A., and wines from 8 to 17 per cent. Port, sherry, and Madeira (qq.v.) are what are called fortified wines; that is, they contain added A. beers that engendered by the fermentation. See also BURGUNDY WINES; CHAMPAGNE WINES; RHÔNE WINES; WINE-MADE.

The physiological effects of A. are well known. It is a powerful stimulant, increasing the flow of gastric juices when diluted, and more concentrated doses producing a longer and more rapid heart-beat. Its possible effects of its continual use: catarrh of the stomach, affections of the liver and kidneys, degeneration of the brain, and delirium tremens. Notwithstanding its therapeutic value, medical men are increasingly unwilling to advocate its use, owing to the bad physical effects and the worse moral degeneration consequent upon the A. habit which might possibly be established.

Alcoholism, addiction to alcohol. The term is also applied to the morbid results of prolonged excessive consumption of alcohol. It is difficult to treat, and, as with all addictions, a cure depends mainly on co-operation of the patient and his determination to succeed. There is no short-cut to victory. A drug called 'antabus' has been used with some success, notably in America, where addiction is a social problem. Alcohol, even in small quantities, taken in association with antabus causes the patient to feel acutely ill, so that he is frightened to try the experiment again. The drug is continued regularly till the craving for alcohol is lost. In some cases, however, the patient prefers to give up the antabus and not the alcohol, as the treatment fails without his will to succeed. A voluntary society, founded in the U.S.A., known as Alcoholics Anonymous, whose members have cured themselves of A. and are willing to help others to do the same, has already done some excellent work. As its name suggests, patients are helped anonymously in confidence. The causal connection between A. and crime has been established, and A. is a social problem in those countries where there is much addiction. For diseases associated with the consumption of A. see CIRRHOSIS; DELIRIUM TREMENS; EPILEPSY; INSANITY; NEURITIS. The general aspects of excessive drinking will be found under DRUNKENNESS.

Alcoholometry, determination of the

proportion of alcohol in a liquid. If the liquid is known to contain only alcohol and water, its sp. gr. as shown by a hydrometer would enable the relative proportions of water and alcohol to be known. In hydrometers used for this purpose the graduations are often marked in percentage of alcohol instead of sp. gr. In Sikes's hydrometer the graduations are arbitrary figures, from which the corresponding percentage of proof spirit may be found by the use of a book of tables issued under the authority of the Commissioners of H.M. Customs and Excise. Atkins's hydrometer is provided with a series of scales which enables the strength of any 'ort,' or beer in the making, to be determined.

Alcolhuas, see **ALHUAS**.

Alcoran, see **KOIN**.

Alcott, Amos Bronson (1799-1888), Amer. philosopher. b. Wolcott, Connecticut. He opened in 1834 a small school in Boston. His methods of education did not find favour there, and finally he went to Concord, where occasionally lectured to schools on philosophical subjects. He was the friend of Emerson, Thoreau, Hawthorne, and Carlyle. His theory was neo-Platonic. He was made dean of the Concord School of Philosophy in 1879. Of his writings the best known are *Concord Days*, 372, and *Table Talk*, 1877.

Alcott, Louisa May (1832-88), Amer. authoress, b. Genantown, Pennsylvania, daughter of Amos Bronson A. (q.v.). She spent most of her childhood in Boston and Concord, Massachusetts, where she was guided in her education by Thoreau and Emerson. After some years as a schoolteacher she was an army nurse in the Civil war. Her first novel, *Moods*, appeared in 184, but what made her famous was her story for children, *Little Women*, 1869, which was followed by *Good Wives*, 1871, *Life Men*, 1871, *Jo's Boys*, 1886, and many others. See lives by E. D. Cheney, 189; C. Meigs, 1933; J. B. Wagoner, 1943; M. Stern, 1952.

Alcoy, Sp. tn in the prov. of Alicante, on the Serpis. It has many old buildings, and a famous festival during which is staged a mock battle between Moors and Christians. Textiles, paper, and machinery are manuf. Pop. 42,800.

Alcuin (735-804), celebrated A.-S. scholar, b. York and educ. at the cathedral school there, of which he afterwards became headmaster. At Parma about the year 780 he met Charlemagne, who enlisted his services in the cause of education. A. founded and directed the *schola palatina*. In old age Charlemagne gave him the abbey of St. Martin at Tours which he reformed and governed until his death. A. was a prolific writer, mostly on theology and the liturgy. Some martyrologies describe him as *Beatus* (Blessed). See *Beati Patris Albini seu Alcuini Opera*, Ratisbon, 1771; A. F. West, *Alcuin and the Rise of the Christian Schools*, 1893; G. F. Brown, *Alcuin of York*, 1904; E. M. W. Buxton, *Alcuin*, 1922; W. H. Howell (trans.), *The Rhetoric of Alcuin and Charlemagne*, 1941.

Alcyonacea, sub-order of Alcyonaria, an order of marine coelenterates. They consist of a firm mesogloea mass, throughout which calcareous spicules are dispersed. The surface is studded with hydra-like polyps, with tentacles. They are found attached to rocks and seaweed. *Alcyonium digitatum* is popularly called dead men's fingers; *A. gelatinosum* is phosphorescent and inhabits deep water.

Alcyone, or **Halcyone**, daughter of Aeolus and wife of Ceyx. One legend says that she and her husband were changed into birds for calling themselves Zeus and Hera, and another that they were changed into kingfishers after Ceyx was shipwrecked and A. had thrown herself into the sea in her grief. 'Halcyon days' were supposed to be days of calm while the kingfisher (alcyon) was breeding in a floating nest.

Aldan. 1. Navigable right affluent of R. Lena, in E. Siberia. Its length is 1100 m.

2. (until 1939 *Nezametnyy*). Tn in S. Yakutia, economic centre of the A. gold-mining area, on the Amur-Yakutsk highway 405 m. from the Trans-Siberian Railway. It was founded in 1923, and became a tn in 1939.

Aldborough, vil. in the W. Riding of Yorks, England, on the R. Ure, on the site of the Rom. tn of Isurium. During the Rom. occupation it was the home of the consuls and governors of York, and remains of their villas may be seen. Pop. 400.

Aldebaran, Arabic name of a first-magnitude star (α) in the constellation Taurus, its exact magnitude being 1.1. It is of a light red colour, and is one of the group of 5 called the Hyades. It is sometimes called the Bull's Eye. The Romans knew it by the name of Palladium, because it set for the last time visibly when the feast of Palas, an old It. deity, was celebrated in the festival of the Palilia at Rome on 21 Apr.

Aldeburgh, tn in Suffolk, England. It used to send members to Parliament, but in 1832 this privilege was taken away. Its church, containing a statue of Crabbe the poet, who was b. at A., and its moot hall are worthy of note. A. was the first tn in England to elect a woman mayor, Mrs Garrett-Anderson in 1908. The A. Festival of Music and the Arts takes place annually in June. Pop. 2500.

Aldegonde, Philip van Marnix de Sainte, see **SAINTÉ ALDEGONDE**.

Aldehyde, name applied to a group of organic compounds prepared by oxidation of primary alcohols. The term is derived from alcohol *dehydrogenatum*—that is, dehydrogenated alcohol. When oxidised, the A.s give fatty acids; formaldehyde produces formic acid, acetaldehyde produces acetic acid, propionaldehyde produces propionic acid, and so on. Therefore the A.s may be looked upon as intermediary between the alcohols and the fatty acids.

The lower members of the group are colourless, mobile, neutral volatile liquids, usually with an irritating smell. The higher members are odourless solids.

The A.s may be prepared by oxidising



B. W. Allen, Alderburgh

ALDERBURGH

The town hall is on the right.

the primary alcohols, or from the fatty acids by dry distillation of their calcium salts with sodium formate. All the lower A.s form crystalline addition products when shaken with a concentrated aqueous solution of sodium hydrogen sulphite. In contact with an aqueous solution of hydrocyanic acid, *cyanohydrins* are formed, which may be converted into hydroxy-acids.

The chief members of the group are formaldehyde (q.v.) and acetaldehyde. *Acetaldehyde* (CH_3CHO) is formed by the oxidation of ethyl alcohol. Commercially acetaldehyde is obtained by causing acetylene (C_2H_2) to combine with water (H_2O) under the influence of a catalyst. It is a very volatile liquid with a penetrating odour, and on exposure to the air gradually oxidises to acetic acid. The term A., when used without qualification, often refers to this compound. Acetaldehyde is of importance in the chemical industry.

Aromatic A.s are generally liquids and may be prepared by oxidation of the corresponding alcohol and by other methods. They undergo a large number of reactions, many of which are of synthetic and industrial importance. The simplest member is *benzaldehyde* ($\text{C}_6\text{H}_5\text{CHO}$), which is contained in bitter almonds and in the kernels of many fruits. Owing to the pleasant aroma of aromatic A.s, many are used in the perfumery industry, e.g. anisaldehyde, vanillin, piperonal, and geraniol.

Alden, John (1599–187), one of the Pilgrim Fathers who sailed for America in the *Mayflower*. In *The courtship of Miles Standish* Longfellow tells the legendary story of his courtship of 'Risella Mullens'.

Alder, see ALNUS.

Alderman(men), title dating from A.-S. times, the word then being 'ealdorman.' In those times the title was held by various distinguished persons, and in the very earliest times the aldermen came next to the king. These ealdormen were nobles by birth, and their office was both civil and military. There were also special titles applicable to certain offices, such as 'aldermannus otius Angliæ,' 'aldermannus regis,' and others. They seem to have been at the height of their power during the time of Alfred the Great, and from then until his time of the Norman Conquest the nature of the office gradually changed, until the word was applied to men holding certain municipal offices.

In modern times A. are members of co., tn., and city corporations, and hold certain powers in local affairs. The Local Government Act, 1933, provides that one-half of the total number of the A. of a council must retire in every third year, being the year in which councillors are elected. In the City of London, which is divided into 26 wards, there are 26 A., and the lord mayor is elected from among the A. In America they have powers of legislation rather than judicature except in certain cases.

As each Amer. city is governed under the laws of its own special charter, and as the provisions of these charters vary greatly, such an official as an A. has vastly different powers in different places. For example, Chicago is governed by supervisors, Boston by an elected council, Washington by commissioners, and New York by a board of A. directly representative of the popular vote. Broadly, however, A. in America form legislative bodies, and, though they have the powers of magistrates in some cases, those powers are of a restricted nature, relating particularly to civic business, the control of the police, and similar functions. In New York or in other Amer. cities where the A. are the controlling body, the powers of these officials are far greater than are usually associated with the office in England; but the mayor, who is their chief and who is elected by the whole city, has also a large authority in the initiation and veto of measures. See COUNTY COUNCIL and LOCAL GOVERNMENT.

Alderney, one of the group known as the Channel Is., lying N. of Jersey and Guernsey. It is separated from the Fr. coast by a strait known as the Race of A.; to the NW. of the is. lie the Casquets, dangerous rocks which have been the scene of many shipwrecks. A. has an exceptionally bracing climate. The coast is mainly rocky, with bays on the N., and the cliff scenery is delightful. There are very few trees. The tn of St Anne stands in the centre of the is. where the soil is very fertile. A. is subject to the jurisdiction of Guernsey, though formerly it was independent. Unlike Sark, no dialect is spoken. A. was occupied in the Second World War by the Germans, who evacuated all the islanders and left it finally in ruins. Pop. 1320.

Aldersgate, ward and street of the City of London, the street running northwards from St Martin's-le-Grand to Goswell Road. The old gate is mentioned about AD 1000 as Ealdredesgate, and means 'the gate of one Ealdred'. John Day, the Elizabethan printer, is said to have lived in the gatehouse, together with John Foxe (see Taylor's *London*). The gate was restored after being burned in the fire of London, but eventually taken down in 1761. The dist. was much damaged by Ger. air raids in 1940-1.

Aldershot, tn in Hants, England, 35 m. from London. At first only a small vill., it grew in importance with the estab. of A. military camp in 1853-4 on the borders of Hants, Surrey, and Berks. A. remains to-day the largest permanent military camp in the U.K. The barracks and grounds in the immediate vicinity of the tn are roughly 4 sq. m. in area. At first there were only wooden huts, but brick buildings and permanent barracks have been added continuously. The bell in the tower of the Cambridge Hospital is made from guns captured at Sevastopol. There are training areas adjacent to the building complex, and during the summer months training schemes are carried out here. Originally the troops quartered at A. were termed the Division of A.; in 1870 they

and their station became the 'A. Dist.,' and in 1901 the 'First Army Corps (A. Dist.).' In 1902 the name was changed to the 'First Army Corps (A. Command),' and in 1904 it became the A. Command. It is estimated that about 3,000,000 men were stationed in the A. Command during the First World War, and it was from A. that most of the 'contemptible little army' went out to Flanders. The highest number stationed in the command at one period was 140,000. There were 60,000 troops on Laffan's plain for Queen Victoria's Jubilee review, and nearly 100,000, including detachments from every part of the empire, on the occasion of Queen Victoria's Diamond Jubilee review. In 1939 the majority of troops in A. again moved out to France. Later during the Second World War A. became a Dist. and part of S. Command, and this position remains to-day, although the Dist. is considerably larger in area than the old Command. Troops in A. are now mainly at depots and training schools and estabs. Between the wars the A. military searchlight tattoo became world famous; first held in the grounds of Gov. House, it later transferred to the Rushmore Arena (specially built for the purpose).

During recent years the bor. has developed to such an extent that it is almost completely built up. Since the Second World War a number of new industries have estab. themselves on a small trading estate in the bor. The tn has a large open-air bathing pool. Pop. 41,020.

Aldgate, ward and street of the City of London; the street connects Fenchurch Street with Whitechapel. The old gate, which was called Eastgate in the Saxon period and, later, Alegate, was the extreme E. gate of the City. Recent excavations establish that it was formerly the site of a Rom. gate. It was rebuilt in 1608 and finally demolished in 1761. Chaucer lived in the old gatehouse under lease from the corporation. The chief remaining old-time feature of A. is the pump.

Aldhelm, or **Ealdhelm** (c. 640-709), Saxon priest and scholar, educ. Canterbury. He became abbot of Malmesbury (676) and Bishop of Sherborne (705). The church of St Lawrence at Bradford, Wilts, alone remains of his buildings. He wrote treatises and verse in Latin and English, some of which survive.

Aldine Press, see ALDUS.

Aldington, Richard (1892-), poet and novelist, b. Hants. Educ. Dover College and London Univ., he started writing at a very early age. In 1913 he became literary editor of the *Egoist*, the Imagist periodical, and married Hilda Doolittle, a leading Imagist poetess. After serving in the First World War he worked as reviewer and translator and pub. sev. vols. of poetry, including *War and Love*, 1919, *A Fool in the Forest*, 1925, and *A Dream in the Luzemburg*, 1930. After living on the Continent for some time he turned to writing novels and produced *Death of a Hero*, 1929, and *The Colonel's Daughter*, 1931. At the beginning of the Second World War he went to America. His

biography *Wellington*, 1946, was awarded the Tait Black Memorial Prize, and his *Complete Poems* appeared in 1949. Later works were a critical study, *Esra Pound and T. S. Eliot*, 1954, and a life of Lawrence of Arabia, 1955.

Aldred, or Ealred (d. 1069), Eng. monk, became abbot of Tavistock about 1027; in 1044 he became Bishop of Worcester, and in 1060 Archbishop of York. He negotiated with the Emperor Henry III for the return to England of Edmund Ironside's son (1054). He probably crowned Harold II, and certainly crowned Wm the Conqueror.

Aldrich, Henry (1648–1710), ecclesiastic, educ. Westminster School and Christ Church, Oxford, where he succeeded Massey as dean in 1689. He wrote *A Compendium of Logic*, 1691, used at Oxford for a long time; he also composed church music. He designed Peckwater Quadrangle (Christ Church) and possibly All Saints' Church, both at Oxford.

Aldrich, Thomas Bailey (1836–1906), Amer. poet and editor, b. Portsmouth, New Hampshire. He worked as a clerk in New York, but had verses printed before he was 15, and in 1855 pub. a vol. of poems, *The Bells*. Moving to Boston, he became friendly with Hawthorne, Longfellow, Whittier, and Lowell. *The Story of a Bad Boy*, 1870, which is partly autobiographical, was followed by the novels *Prudence Palfrey*, 1874, *The Queen of Sheba*, 1877, and *The Stillwater Tragedy*, 1880. From 1881 to 1890, as editor of the *Atlantic Monthly*, he wielded a commanding influence over Amer. letters. His collected writings were pub. in 1907.

Aldrovandi, Ulisse (1522–1605), celebrated It. naturalist, b. Bologna. In 1553 he took his medical degree at Bologna, and occupied the botany and natural hist. chairs of that univ. He estab. the botanic gardens at Bologna in 1567, and also formed a natural hist. museum. He travelled in almost every part of Europe to collect information for his great work on natural hist., the first vol. of which was pub. in 1599. The complete work was not pub. until 1608. He was imprisoned as a heretic at Rome, but was afterwards released.

Aldstone, see ALSTON.

Aldus Manutius, or Manuzio Aldo (c. 1450–1515), It. printer and author, b. Bassiano, near Velletri, SE. of Rome. He spent some time in the study of the classics, subsequently becoming tutor to the princes of Carpi, whose family supplied him with money for starting his printing press, set up in Venice in 1490. His first book, Musæus's *Hero and Leander*, appeared 4 years later. A.'s first important work was a 5-vol. *Aristotle* in 1495–9. This he followed by eds. of Gk and Lat. classics. To make books as cheap as possible A. used Italic type. The first use of Italic was for a few words in an illustration of *Letters of St Catherine of Siena*, 1500, and the first Italic book, *Virgil*, came a year later. Among his famous eds. were *Se Aetna* by Cardinal Bembo, 1495, and the *Hyperbomachia Polifili*, 1499. The designs of the type used in these two

pubs. are in current use with the names Bembo and Poliphilus respectively. A. was the founder of the Aldine Press. See M. Ferrigni, *Aldo Manuzio*, 1925, and G. Fock, *Bibliotheca Aldina*, 1930.

Aldwych, London thoroughfare, constructed in 1900–5, forming a loop on the N. side of the Strand. The name was revived to commemorate a settlement of Danes in this area. Bush House fronts on A.; beside it is India House, and opposite the Waldorf Hotel. See also SAINT CLEMENT DANES.

Ale, originally malt liquor brewed without hops, but not generally a synonym for beer (see BREWING). The application of the term varies according to locality, but it is never used to denote stout. Mild A. is beer with a sweetish flavour and a fairly dark colour. Pale A., whether in cask (in which form it is usually termed bitter beer) or in bottle, is light in colour and has a pronounced hop flavour. The term A. often had a connection with the periodic or festive nature of brewing or drinking, as in Oct. A., Whitsun A., cuckoo A., harvest A., and bridal (originally bride-ale).

Ale-conner, or Ale-kenner, one who knows what good ale is. In ancient times in this country A.s or ale-tasters (called *gustatores cervisiae*) were appointed annually in the court-leet of each manor, in bors. and corporate tns, to see that the ale was good, and that it was sold at proper prices. In the City of London four were appointed every year, but the office is now a sinecure.

Aleardi, Aleardo (1812–78), It. poet and patriot, b. Verona. He studied first philosophy, then law. His poetry is full of passionate hopes for the liberation of Italy; twice he was imprisoned by the Austrians (1852 and 1859). His best-known political poems, received with the greatest enthusiasm by his contemporaries, are *Le città italiane marinare e commercianti*, 1856, *I tre fiumi*, 1857, *Il Monte Circello*, 1858, and in 1859, shortly before the outbreak of the war against the Austrians, *Triste dramma*. After his second imprisonment he returned to Italy, became a Member of Parliament, and in 1864 was appointed prof. of aesthetics in Florence. See *Canti scelti*, ed. L. Grilli, 1918, and G. Giuliano, *Aleardo Aleardi nella vita e nell'arte*, 1934.

Aleatory Contract (Dice-players' Contract), legal term used of an agreement involving risk of loss or the chance of gain and dependent on a hazardous event. Under this head are wagers and insurance.

Alecsandri, Vasile (1821–90), Rumanian poet. After studying in Paris he returned to Moldavia in 1839 and in 1840 was made one of the directors of the new Moldavian theatre in Jassy. After the ineffective movement of 1848 he continued, in exile, to support the cause of Rumanian nationalism with propaganda. After the union he was sent on a mission to Paris, London, and Turin to reassure the W. of Cuza's intentions. From 1861 he devoted himself exclusively to literature until 1885 when Carol I appointed him minister in

Paris. He was the first to collect Rumanian folk poetry. He founded a literary magazine. His writings include lyrics, epics on subjects from Rumanian history and legend, plays adapted and original, and autobiographical and critical articles. In 1878 he won the Félibrige Prize for a poem on the Lat. race. His influence extended beyond language and literature into the whole cultural life of Rumania.

Alecto, sister of Megaera and Tisiphone. These 3 sisters were known as the Erinyes or Furies, and pursued the guilty. The most famous victim of their vengeance was Orestes, pursued for the murder of his mother, Clytemnestra (q.v.).

Alcohol were houses where ale was sold. In 1496 an Act passed 'against vacabounds and beggars' (11 Hen. VII. c. 2) contained a clause regulating A., and from that time different Acts were passed for that purpose. In 1828 a general Act to regulate the granting of alchouse licences was passed (9 Geo. IV. c. 61), which repealed all former statutes on this subject. See LICENSING LAWS.

Alekhine, Alexander (1892-1946), chess-master, b. in Moscow, son of a Russian nobleman; studied law at the univ. of Paris, and became a naturalised Fr. citizen. He won the title of master at chess in 1909, when, at 16, he took the prize in the St Petersburg amateur tournament. From 1921 he dominated the chess world with a remarkable series of first prizes. Then, in 1927, he challenged the world champion, Capablanca, and won the title after a protracted match. As world champion he was even more successful than before. At his best period he was perhaps the greatest player the world has ever seen. The variations in the openings he discovered and popularised are many, and he was one of the best and most lucid annotators, as may be seen from his books, *My Best Games of Chess*, 1908 to 1923, and 1924 to 1937; *The New York Chess Tournament*, 1924; and *Nottingham*, 1936.

Aleksandropol, see LENINAKAN.

Aleksandrovsk, see ZAPOROZH'YE.

Aleksandrovskoye, vil. in the Irkutsk oblast of S. Siberia, 47 m. NW. of Irkutsk. It is known because of its hard labour prison, founded in 1873 (political prisoners since 1904); it was a concentration camp from 1919, and is now an isolator for important political prisoners.

Alekseyev, Mikhail Vasil'yevich (1857-1918), Russian general. In 1915 he was appointed Commander-in-Chief on the Russian W. front and soon afterwards Chief of Staff to the Supreme Commander-in-Chief (Nicholas II). In May-June 1917 he was Commander-in-Chief of all Russian armies, then again Chief of Staff under Supreme Commander-in-Chief Kerensky. He showed himself an able administrator and strategist. In 1918 he organised in the Kuban' region the first anti-Bolshevik volunteer army, but soon after d. of pneumonia.

Aleksinac, tn in Serbia, Yugoslavia, on the Morava. It is a coal-mining centre and mkt tn. Pop. 3100.

Alemán, Mateo (1547-c. 1613), Sp. novelist of Jewish descent, b. Seville, and d. Mexico. He was the author of the famous and popular novel entitled *Guzmán de Alfarache*, Madrid, 1599. This work, which was trans. into English, French, and Italian, is one of the many novels called *picarescas* describing the life and manners of rogues, vagabonds, and beggars. Le Sage's *Guzmán d'Alfarache* has no resemblance to the novel by A. In 1604 A. pub. a life of St Antonio de Padua, and in 1609, in Mexico, pub. *Ortografía castellana*. See F. Rodríguez Marín, *Vida de M. Alemán*, 1907, and E. Moreno Báez, *Lección y Sentido del Guzmán de Alfarache*, 1948.

Alemanni, Alamanni, or Alamans, confederacy of sev. Ger. tribes which was formed between the Danube, the Rhine, and the Main about the 2nd cent. AD, and from the 3rd to the 5th cent. was frequently at war with the Romans. They were not crushed until Clovis defeated them utterly in the battle of Tolbiac, 496. At one time they extended their dominions to the Vosges and to the Alps. It is from this people that the French derived the words *Allemagne* and *Aleman* for Germany and a German respectively.

Alembert, Jean le Rond d' (1717-83), Fr. writer and mathematician, one of the leading *philosophes* of the 18th cent., b. Paris. In 1741 he became a member of the Academy of Sciences, and in 1743 pub. his work, *Traité de dynamique*, explaining 'A.'s Principle. He helped Diderot to prepare his *Encyclopédie*, and wrote the *Discours préliminaire*, 1751. In 1754 he was admitted to the Fr. Academy. His mathematical treatises were collected in *Opuscules mathématiques*, 1761-80, and his collected works in *Oeuvres philosophiques, historiques et littéraires* (18 vols., 1805). See M. Müller, *Essai sur la philosophie de Jean d'Alembert*, 1926.

Alembic, apparatus, now obsolete, used by alchemists for distilling.

Alemtejo, see ALTO ALENTEJO and BAIXO ALENTEJO.

Alençon, Fr. tn in the dept of Orne, at the confluence of the Sarthe and the Briante. The church of Notre Dame has beautiful 16th-cent. stained-glass windows. There are printing and hardware works, and an agric. market. The making of the famous *point d'Alençon* lace has almost ceased. Pop. 19,700.

Alentejo, see ALTO ALENTEJO and BAIXO ALENTEJO.

Aleppo (native name *Halab*), cap. of the prov. of A. in Syria, situated on the R. Kuweik on the edge of the Syrian desert. The first known mention of A. is in documents from Boghazkoi of the 2nd millennium BC where it appears as Khallab or Khallav, since when it has had an unbroken existence. After the Muslim conquest it was a prov. cap. till 944, when it became independent and stayed so till about 1015; the crusaders tried in vain to capture it, and afterwards its hist. was confused till it became a part of the Ottoman empire in 1517. It was formerly the great trade centre between Europe and Asia, exporting silk, cotton, and woollen goods to the E. The discovery of the Cape route

to India damaged its trade; the earthquake of 1812, the plague of 1827, and the cholera of 1832 added to its ruin. But it recovered from its misfortunes, and before 1914 was still an important centre of trade. After the separation from Turkey in 1919 its trade suffered because Turkey would have no dealings with it and appropriated all the water of the Kuweik. A. is a centre of the tobacco and silk industries with many weavers; it is well known for its pistachio nuts. A. was united with Damascus to form Syria under a Fr. mandate which was ended in 1946, since when Syria has been independent with a troubled political hist. Independence was not won easily, for Damascus was shelled in 1945 and Lebanon, the traditional friend of France, was solidly on the side of Syria. The railway to Rayak, on the line from Beirut to Damascus, was opened in 1926 and A. is now on the line to Bagdad; it is also an airport. The Iraq oil pipeline has one terminus at A. Silk and cotton goods, leather, grain, carpets, tobacco, and wine are exported from Latakia, its port. The citadel is impressive and the gate tower one of the finest. The Halawiya college was formerly the cathedral and the bazaars are extensive and busy. Pop. (tn) 380,000, consisting of Muslims (Arabs and Turks), Greeks, Armenians, and Jews. The sanjak of Alexandretta was ceded in 1939 by France to Turkey.

See A. Russell, *Natural History of Aleppo*, 1794, and Ibn al-Adim in *Recueil des Historiens des Croisades*, vol. iii.

Alerion, see **ALERION**.

Alès (anc. **Alais**), Fr. tn, cap. of an arron., in the dept of Gard, on the Gardon. It was a stronghold of the Huguenots (q.v.), with whom Richelieu here concluded a treaty in 1629, granting them liberty of conscience but suppressing certain political privileges. It is in a rich coal-field, and manufs. silk, glass, and iron. Pop. 34,700.

Alesia, usually identified with Alise-Ste-Reine, was the scene of Caesar's victory over Vercingetorix in 52 BC, which completed his conquest of Gaul. Since the mid 19th cent. excavations have been made at Alise-Ste-Reine, and a statue of Vercingetorix stands near the tn.

Alesius, Alexander (1500-65), Scottish divine, b. Edinburgh and educ. at St. Andrews; was a strong supporter of the Reformation, settled in Wittenberg, became a friend of Luther and Melancthon, and signed the Augsburg Confession.

Alessandria: 1. Prov. of Italy, in SE. Piedmont (q.v.). It contains the W. end of the great N. plain of Italy, but has hills in the NW., and, in the S., ridges of the Ligurian Mts. (see **APENNINES**). It is watered by the Po (q.v.) and its trib. the Tanaro. The prin. tns include A., Acqui, and Novi (q.v.). Area 1405 sq. m.; pop. 480,000.

2. It. tn, cap. of the prov. of A., 45 m. ESE. of Turin (q.v.). It is on the Tanaro, and was an important fortress during the struggle between the papacy and the empire. There is a fine 19th-cent.

cathedral. A. is the centre of a corn and wine producing dist., is a railway junction, and has engineering, cotton, and hat manufs. Pop. (tn) 55,400; (com.) 83,000.

Alesund, see **ALESUND**.

Aletschhorn, one of the highest peaks in the Bernese Alps, being 13,721 ft. It was first ascended by Tuckett in 1859. The Aletsch, 12 m. long, is the largest glacier in Switzerland; at its E. extremity is the Mårjelen Lake.

Aleurone Grains, or proteid grains, are solid granules of proteid substance which act as reserve stores of food for the embryonic plant. They occur in the general protoplasm of the plant, but especially in the seeds. In shape they are round or oval, and they contain mineral matter in the form of a *globoid* of lime and magnesia or a crystal of calcium oxalate. In oily seeds, such as the brazil-nut, there is also a *proteid crystalloid*.

Aleutian Islands, chain of about 150 is., extending c. 1100 m. SW. from the peninsula of Alaska towards Kamchatka, the greater number of which belong to the U.S.A. They were first explored by Russians, in 1768, and Capt. Cook in 1778 made further explorations. The is. are mostly barren—attempts have been made at cultivation, but with little success. Many of the mt summits are volcanoes. The largest is. is Unimak, which contains 2 active volcanoes, and, excepting Attu, is the nearest to the mainland of Alaska. The only industries are fishing—whale and seal—and hunting. Unalaska is the chief is. for trade. It has a good harbour, a par. church, and trading estabs. The exports are fish and furs. The inhab. are of Eskimo origin, and they belong to the Gk Church. In June 1942 the Japanese made a descent on Attu, the westernmost is., under cover of a raid on the Amer. base at Dutch Harbour. At this time the A. I. (apart from Unalaska) were undeveloped, unfortified, and uninhabited for the most part, but they were of strategic importance, for Attu is the part of Amer. ter. nearest to Japan (1200 m), and the occupation by Japan put her within 1000 m. of the Alaskan Peninsula. The occupation of Attu was soon followed by an equally unopposed occupation of Kiska, which has a good harbour. But in Aug. the Americans, by rapid construction, estab. a defended air station on one of the Andreanof group, the next in the chain to Rat Is., of which Kiska is the chief. From this airfield the Amer. bombers frequently raided Kiska. Pop. 5500.

Alewite, the popular name of a fish belonging to the Clupeidae, probably so called from a fanciful resemblance to the stout hostess of an ale-house. It is 8-10 in. long, and is common in N. America. It is related to the herring and sprat, and is used for food.

Alexander (b. c. 100 BC), Jewish prince, son of Aristobulus II and grandson of Judaeus, was taken captive in Judaea by Cn. Pompey, 63 BC, but escaped. He was defeated near Jerusalem, 57 BC, by Marcus Antonius, who had been sent

against him by Gabinius, governor of Syria. A., however, conquered Judaea, put many Romans to death, and besieged the rest in Mt Gerizim. At last he was defeated by Gabinius, and beheaded by Metellus Scipio by the order of Pompey, 49 BC. See Josephus, *Antiquities of the Jews*, xiv-xvi passim.

Alexander I, King of Macedonia (c. 504-450 BC), was the son of Amyntas I. whom he succeeded. He had to submit to the Persians, and, though he secretly favoured the cause of the Greeks, he accompanied Xerxes in the invasion of Greece, 480 BC.

likely to be ousted from his position as heir to the throne of Macedon, that Phillip fell by the hand of an assassin in 336.

Recognised by the army, A. had no difficulty in obtaining his father's throne. Although the assassination caused some slight unrest and a tendency in the hill tribes towards revolt, he was in the same year recognised as generalissimo of the army of the Greeks against the Barbarians. Attacking the Barbarians of the N., and crushing a revolt in W. Macedonia, he was obliged by a revolt of the Thebans to strike a blow at Greece. There was no hesitation in the policy he



I. W. Hutchison

ALEUTIAN ISLANDS: UNALASKA VILLAGE AND DUTCH HARBOUR

Alexander II, 16th King of Macedonia (369-367 BC), was the son of Amyntas II, whom he succeeded. He reigned only 1 year and a few months.

Alexander III, or the Great (356-323 BC), was the son of Philip II of Macedon and his wife Olympias. He was b. at Pella, and received his education partly at the hands of Aristotle, who seems to have invested him with a deep and lasting love for Homer, and partly in the court of his father, where the numerous comings and goings of embassies must have given his education its practical side. Nor was his education in the art of war neglected, for at the early age of 16 he quelled a rising that had broken out at home in his father's absence. Quarrels occasioned by the repudiation of his mother and the marriage of a new wife by Philip II caused his withdrawal from the court; but later he was (at least openly) reconciled with his father, whom he accompanied at the battle of Chaeronea (338 BC). Whether A. was involved or not, it was during the period when he was under a cloud, and

adopted; Thebes had revolted, therefore Thebes must be crushed, and to all intents and purposes Thebes was wiped out of existence. The GK alliance against the Barbarians was then renewed, no hostility being openly shown.

Early in 334 A. crossed the Hellespont on the first stage of his expedition against Persia, and won his first great victory on the Granicus in Mysia. Having occupied Sardis and other important cities, he entered N. Syria, defeated Darius III at the battle of Issus (333), and subdued the whole of Syria and Phoenicia, notwithstanding an offer of negotiation by the Persian king. A. spent the winter of 332-331 in Egypt, where he was welcomed as a god and founded the city of Alexandria. Striking once again at Persia, he routed Darius before Gaugamela (20 Sept. 331), took Babylon, seized the Persian treasury at Susa, and rapidly subdued the mt tribes. In the following year the fugitive Darius was assassinated by Bessus, satrap of Bactria, who assumed his crown but was soon betrayed to A.

and executed (328). By this time, however, A.'s popularity had begun to wane. He was no longer the King of Macedon alone: he had conquered a great empire, he had worshipped at the Egyptian temples, he had worn the dress of a Persian; he was no longer the Greek captain-general, he was an oriental despot. The discontent showed itself in conspiracy, which was immediately put down by the execution of the ringleaders.

But the discontent of his Macedonian followers was still apparent, and showed itself in a number of gloomy incidents, amongst which can be numbered the murder of Clitus and the execution of Callisthenes, the nephew of Aristotle.



Glyptothek, Munich

ALEXANDER THE GREAT

By the end of 327 A. was preparing to invade India. Meeting with strong opposition from the hill tribes, he succeeded in reducing most of their fortresses and reaching the Indus. The riv. was bridged, and A. hurried on to the Hydaspes (Jhelum), where he defeated King Porus who attempted to dispute his passage. A. then moved eastwards, and had reached the Hyphasis (Sutlej) when his army mutinied. He therefore turned back and sailed downstream to the mouth of the Indus accompanied by some of his troops, the rest of whom marched along the banks in 2 divs. Nearchus (q.v.) was then ordered to sail with the fleet to the Persian Gulf, while A., at the head of the army, moved through Gedrosia to Susa, reaching that city early in 325. While the troops enjoyed a well-earned rest, A. undertook a number of administrative reforms, gave Asiatic wives to about eighty of his senior officers, and himself married Barsine, the eldest daughter of Darius. She was his second wife; in 327 he had married Roxana, daughter of the Bactrian Oxyartes and mother of his posthumous son Alexander

Aegus. From Susa A. moved to Babylon, which he intended to make the cap. of his empire. Here he was stricken with fever. The disease was not regarded seriously at first, but rapidly became worse, and 10 days later the Macedonian army were allowed one by one to pass through the chamber of the dying prince in order to bid him farewell. On the following day he d. (323). See L. V. Cummings, *Alexander the Great*, 1940; H. Lamb, *Alexander of Macedon: The Journey to the World's End*, 1947; W. W. Tarn, *Alexander the Great*, 1948.

Alexander I, King of Epirus (342-330 BC), was the son of Neoptolemus and brother of Olympias, the mother of A. the Great. In 332 he went to Italy to aid the Tarentines against the Lucanians and Brutii. He was defeated and slain in battle near Pandosia, on the banks of the Achéron in southern Italy.

Alexander II, King of Epirus, son of Pyrrhus and Lanassa, succeeded his father 272 BC.

Alexander I, King of Syria (150-146 BC), surnamed **Balas**. He pretended to be a son of Antiochus IV, Epiphanes, and usurped the throne of Syria from Demetrius I. Balas was, however, defeated and dethroned by the son of Demetrius, who came to the throne as Demetrius II.

Alexander II, King of Syria (128-122 BC), surnamed **Zabina** or **Zabinas**. At the instigation of Ptolemy Physcon he usurped the throne of Demetrius II; but 6 years later he was defeated and put to death by Antiochus Grypus.

Alexander, name of 8 popes: Alexander I (106-15), Alexander II (1061-1073), Alexander III (1159-81), Alexander IV (1254-61), Alexander V (1409-10), Alexander VI (1492-1503), Alexander VII (1655-67) (see CHIGI, FABIO), Alexander VIII (1689-91).

Alexander II (1061-73) was the nominee of Hildebrand, whose policy he carried out in preparation for the accession of Hildebrand himself (Gregory VII). He it was who sanctioned the Norman invasion of England and sent the sacred banner to William the Conqueror.

Alexander III (1159-81) succeeded Adrian IV; his appointment was opposed by Frederick Barbarossa. Held the third Lateran Council, 1179. Sanctioned Henry II's invasion of Ireland, and humbled the same king after the murder of Becket. Spent the latter part of his pontificate in exile, being driven from Rome by the rep.

Alexander VI (1492-1503) (Rodrigo Borgia), b. in 1431 in a little Sp. vil. near Valencia, was by the influence of his uncle, Calixtus III, rapidly advanced in the Church. He became successively bishop, cardinal, and vice-chancellor, and served in the Rom. court under 5 popes. During this period he acquired wealth, influence, and position. His 2 outstanding sins were his love for gold and women. His children by his mistresses seem to have formed the basis of his ambition, since for them he did all that he possibly could. By a system of judicious and gigantic

bribery he became pope on the death of Innocent VIII. At first his period of power was quiet and satisfactory, but he soon left no doubt as to his exact policy. A system of nepotism began, which even in an age of nepotism frightened his contemporaries by the lengths to which it went. To advance his son, to make a splendid marriage for his daughter, he was prepared to spend the wealth of the Church or to destroy the peace of Italy. The secularisation of the Church was carried to unheard-of lengths. The Church was to A. merely a means of carrying out his schemes for the advancement of his family. Even if all the stories of his poisonings and immoralities cannot be accepted, since our knowledge of his reign depends largely on the writings of his enemies, there still remains no doubt that he was guilty of much. He was a great patron of art, and during his pontificate many treasures of art were produced for him. He employed Raphael, Michelangelo, and Pinturicchio at one period or another. He *d.* on 18 Aug. 1503, having dragged down the papacy to the lowest depths to which even in the Renaissance days it had descended. His most famous, or infamous, children were Giovanni, Duke of Gandia (1474), Cesare (1476), and Lucrezia (1480). *See* BORGIA.

Alexander, name of 3 kings of Scotland:

Alexander I (the Fierce) (*d.* 1124), fourth son of Malcolm Canmore, succeeded his brother Eadgar in 1107. He ruled over Scotland N. of the firths of Forth and Clyde, Cumbria being given as an appanage to his younger brother David. He succeeded in establishing firmly the royal authority in the N. He married Sybille, a natural daughter of Henry I, and *d.* childless.

Alexander II (*d.* 1249), son of William the Lion, succeeded to the Scottish throne in 1214. From the time of his accession he was in communication with the still disaffected Eng. barons, and, despite the stipulations in Magna Carta on behalf of the Scots, he joined forces with the barons when hostilities again commenced. He retreated before the army sent against him by John, an army which successfully laid waste the border cos. of Scotland. This border war continued until 1217. In 1216 A. paid homage for his Eng. possessions to Louis of France. He married the sister of Henry III of England (Joanna) in 1221, and during his reign the definite boundaries of the 2 kingdoms seem to have been fixed, though no formal frontier was drawn. A. consolidated the royal authority in Scotland, and was a generous patron of the Church. He married secondly (1239) Marie de Coucy, by whom he had a son, Alexander III.

Alexander III (1241-86) succeeded to the throne in 1249. He was successful in bringing the W. Is. under his power in 1263. The later period of his reign was devoted to administrative reforms, which limited the power of the barons and brought Scotland a period of peace and prosperity. He was killed in 1286 by falling over the cliffs near Kinghorn, and

left as his heiress his two-year-old granddaughter, the Maid of Norway.

Alexander (1461-1506), King of Poland and Grand Duke of Lithuania. He became Grand Duke of Lithuania in 1492 and King of Poland in 1501.

Alexander, name of three Russian emperors:

Alexander I (1777-1825), son of Paul I. He was well educ. under the supervision of Catherine II (his tutor was a Swiss republican, a follower of Rousseau). He succeeded to the throne in 1801. The first half of his reign was marked by several reforms and improvements: the abolition of torture, the estab. of ministries and of the Council of State, and the foundation of sev. univs. and of an extensive state school system; the liberation of serfs (without land) in the Baltic Provs. and the granting of permission to squires elsewhere to free their serfs with land; and the grant of a constitution to Poland. Later, however, A. became mystical and reactionary, and undid much of the good previously done. In foreign affairs he allied himself alternately with England and Napoleon, acquired for Russia Finland, Bessarabia, and a large part of the Caucasus, and was the inspirer of the Holy Alliance (q.v.). The main event of his reign was the patriotic war in 1812 against Napoleon, which profoundly influenced the future development of Russia. *See also* ARAKCHEYEV; CZARTORYSKI; DECEMBRISTS; KUTUZOV; SPERANSKIY.

Alexander II (1818-81), called Tsar-Liberator for the emancipation of the serfs in Russia (1861) and the liberation of Bulgaria from the Turks (1878). The son of Nicholas I, he received a good education under the poet Zhukovskiy, and succeeded to the throne in 1855. His reign was a period of Great Reforms (q.v.) in Russia which completely transformed and modernised her social and political life. In foreign affairs he adhered to the principle of non-interference, except in the case of Turkey, where the massacres of the Bulgarians aroused universal indignation in Russia. The Polish uprising in 1863, the final conquest of N. Caucasus (*see* SHAMIL) and Turkestan, and the development of the underground revolutionary activities by Populists (*see* POPULISM), culminating in terror against leading representatives of the state, were other important events of A.'s reign. Sev. attempts were made by the terrorists on his life, and eventually he was killed by a bomb on the very day that he had signed a decree approving the plan of a constitution for Russia. *See also* GORCHAKOV and LORIS-MELIKOV.

Alexander III (1845-94), second son of A. II. He became heir apparent in 1865 on the death of his older brother, and succeeded to the throne in 1881. His policy in internal affairs, influenced by Pobedonostsev (q.v.), was one of consistent reaction and resulted in undoing much of what his father had achieved, in Russification measures towards national minorities and progressive discrimination against the Jews. At the same time a

protectionist economic policy facilitated the rapid industrial development of the country, which resulted in a great increase of the number of industrial workers and the spread of Marxist and Social Democratic ideas. In foreign affairs A. III strictly followed the policy of peace and non-interference; towards the end of his reign the Franco-Russian *rapprochement* took place.

Alexander I (1857-93), Prince of Bulgaria (Prince A. of Battenberg). A nephew of the Tsar A. II of Russia, he was, on the proposal of Russia, elected first sovereign Prince of Bulgaria (1879). Once elected, however, A. pursued a policy which ran counter to Russian interests. As a result, Russian pressure compelled him to abdicate in Sept. 1886. He *d.* in Austria.

Alexander (1888-1934), King of Yugoslavia; *b.* at Cetinje; second son of Prince Peter Karageorgevich (Karageorgević). A's mother was a daughter of Nicholas, reigning Prince of Montenegro. His early days were spent at Geneva, where his father lived in exile. A. was sent to St Petersburg in 1899 to be educ. In 1909 he rejoined his father in Serbia, where the latter was now king. A's elder brother George having been forced to renounce his claim to the succession, A. was recognised as heir. He distinguished himself in the Balkan wars of 1912 and 1913; and during the First World War he was made Commander-in-Chief of the Serbian Army. He was with the army in its retreat before the central powers; then headed the Serbian Gov. in exile at Corfu, and visited the W. Allies' camps. When his father *d.* in 1921, A. was proclaimed King of Yugoslavia. He married, 1922, Marie, daughter of Ferdinand of Rumania. In 1929 he suspended the constitution, and created a dictatorship, in a drastic attempt to settle the country's racial and political problems by attempting to unite all sections of the pop. under his personal rule. But the Croat and Slovene sections of the pop. remained restive and convinced that the Serb element was being favoured at their expense. A. was assassinated in Marseilles on 10 Oct. 1934 by a Croat subject a few moments after he had disembarked there. M. Barthou, Fr. foreign minister, who was in the same motor-car, was also killed.

Alexander (1893-1920), King of the Hellenes, second son of King Constantine, on whose dethronement he ascended the throne of Greece, 1917. His gov., with Venizelos as Premier, enjoyed the confidence of the W. powers. During his reign the boundaries of Greece were much extended. He *d.* of blood-poisoning, 25 Oct. 1920, as a result of a monkey bite.

Alexander, Bishop of Lincoln (*d.* 1148), nephew of Roger, Bishop of Salisbury. He became archdeacon of Sarum, and Bishop of Lincoln in 1123. He took the side of Stephen in the civil war, although he had sworn allegiance to Maud. Suspected of disloyalty, he was arrested, imprisoned, and dispossessed of his castles. He probably crowned Stephen in 1146.

Alexander, Archibald (1772-1851), Amer. Presbyterian divine, *b.* Virginia. In 1791, after being licensed to preach, he became known as a great and eloquent revivalist preacher. He afterwards became prof. in the newly created Princeton Theological Seminary, where he remained until his death. Amongst his theological works may be mentioned *The Outlines of Moral Science*, 1852, and *A History of the Israelitish Nation*, 1853.

Alexander, Boyd (1873-1910), noted as an explorer, *b.* Cranbrook, Kent. He took part in the famous A.-Gosling expedition (1904-7), which crossed Africa from the Niger to the Nile. It was during this expedition that his brother, Claud A., and his fellow explorer Gosling both lost their lives as a result of the hardships which they had to endure. In 1909 A. began his last ill-fated journey. After passing Lake Chad in safety at Wadai, just on the borders of the Brit. sphere of influence in the Sudan, he was attacked by natives and killed.

Alexander, Cecil Frances (c. 1820-95), see ALEXANDER, WILLIAM.

Alexander, Sir George (1858-1918), actor and theatrical manager, *b.* Reading. He was educ. for a City life, but his enthusiasm as an amateur actor soon led him to the stage. He started at the Theatre Royal at Nottingham at the age of 21, and 2 years later joined Sir Henry Irving at the Lyceum. He became a manager in 1890 at the Avenue Theatre, and in the following year opened at St James's. His long tenancy of that theatre was one of the most distinguished in the annals of the Eng. stage. On the stage he could play the lover to perfection, avoiding both bathos and mawkishness.

Alexander, Sir James Edward (1803-1885), Brit. soldier and traveller. He joined the E. India Co.'s army in 1820. In 1825 he became an officer in the Brit. Army, and he later took part in the Kafir, Crimean, and Maori wars. Amongst other things, to him is largely due the transfer to England of Cleopatra's Needle, 1877.

Alexander, John White (1856-1915), Amer. artist, *b.* Allegheny, Pennsylvania. Among his works are 'Miss Dorothy Roosevelt,' 'Pandora,' 'Rodin,' 'Walt Whitman,' 'The Quiet Hour,' and 'A Ray of Sunlight.'

Alexander, Samuel (1859-1938), philosopher; *b.* Sydney, N.S.W. Educ. Wesley College, Melbourne; univ. of Melbourne; and Balliol College, Oxford. First class in classical and in mathematical moderations, 1879; first class Lit. Hum., 1881. Scholar of Balliol, 1878. Fellow of Lincoln College, 1882-1893. Gifford lecturer, Glasgow, 1916-18. M.A., Hon. LL.D., St Andrews and Birmingham; Hon. D.Litt., Durham and Liverpool. His philosophy attaches great importance to Awareness; which, though different in kind from its objects, is derived from them—paralleling the results of chemical reactions. A. thus arrives at Emergent Evolution: the emergence of totally new things from combinations of the old. Space-time, the original matrix,

gave birth to matter in varying forms; which in turn gave birth to mind. From mind, God is expected to emerge. (See his *Space, Time, and Deity*, vol. ii, especially p. 399.) Publications include *Moral Order and Progress*, 1889, *Locke*, 1908, *Space, Time, and Deity*, 1920, *Spinoza and Time*, 1921, and *Beauty and other Forms of Value*, 1933. He received the Order of Merit on the king's birthday, 1930.

Alexander, William (1824–1911), Archbishop of Armagh and Primate of all Ireland, *b.* Londonderry, educ. at Tonbridge Grammar School and Brasenose College, Oxford. He held a number of livings in the N. of Ireland before being made Bishop of Derry and Raphoe in 1867. He became Primate of All Ireland in 1896. A. was the author of a number of theological works, and was also distinguished as the writer of *St Augustine's Holiday and other Poems*, 1886. His wife, Cecil Frances Alexander, is famous as the author of the hymn 'There is a green hill far away,' and of numerous other well-known hymns.

Alexander, William, Earl of Stirling (1567–1640), statesman and poet, *b.* Alva, Clackmannanshire. Educ. at Glasgow Univ. and Leyden, he became a courtier, followed James VI to England, and received from him the grant of a vast tract of land in what is now Canada, but this was rendered null by the Fr. conquests. In 1626 he was appointed secretary of state for Scotland and in 1633 was made an earl. Besides *Aurora*, 1604, and *Recreations with the Muses*, 1637, he wrote a long epic on *Doomsday*, 1614–37, and 4 'monarchic tragedies, *Darius*, 1603, *Croesus*, 1604, *The Alexandrian Tragedy*, 1605, and *Julius Caesar*, 1607.

Alexander, William Lindsay (1808–1884), Scottish theologian. He became recognised as a master of classical erudition. He ed. in 1861 the 3rd ed. of Kitto's *Biblical Encyclopaedia*. From 1877 he was principal of Edinburgh Theological Hall.

Alexander Archipelago, congeries of is., over a thousand in number, off coast S. of Juneau, Alaska, U.S.A. The chief is. are Ketchikan, on Revillagigedo Is., and Sitka, on Baranof. The industries are lumbering, fishing, fur farming, and gold mining.

Alexander Land, dist. in the Antarctic, lat. 68° 43', long. 70–5°, discovered by Bellingshausen, 1821.

Alexander Nevsky (1220–63), Grand Prince of Vladimir in medieval Russia. He received an excellent educ. In 1240, as Prince of Novgorod, he routed the Swedes on the R. Neva (hence Nevsky), and in 1242 inflicted decisive defeat on the Teutonic Knights in the famous battle on the ice of Lake Peipus. He defended Russia equally successfully against the Lithuanians, and in 1252 was appointed Grand Prince by the Khan of the Golden Horde. A. N. spent the rest of his life in endeavouring to ameliorate the lot of the Russians and relieve the distress occasioned by the Tatar invasion, and was canonised by the Orthodox

Church. Peter the Great founded a monastery in St Petersburg dedicated to him, and instituted an order called after him which was abolished in 1917 but revived in 1942 as a military decoration.

Alexander Obrenović (1876–1903), King of Serbia. He was proclaimed king under a regent on the abdication of his father Milan I in 1889, and took the gov. into his own hands in 1893. He aroused great opposition by his marriage to Draga Mashin in 1900, and by his arbitrary rule. A. and his wife were brutally murdered by military conspirators in 1903, the Karageorgević family thereby gaining the Serbian throne.

Alexander of Aegae, Peripatetic philosopher of Rome in the 1st cent. AD, who was tutor to the Emperor Nero.

Alexander of Aphrodisias in Caria lived at the end of the 2nd cent. and the beginning of the 3rd cent. AD, was a celebrated Peripatetic philosopher, and the greatest of the early commentators on Aristotle.

Alexander of Hales (c. 1175–1245), theologian, surnamed *Doctor Irrefragabilis*, *b.* Glos. He studied at the univ. of Paris, and about 1231 joined the order of Friars Minor. As *magister regens* of the Franciscan chair of theology at Paris he numbered among his pupils St Bonaventura and Roger Bacon. His prin. work is *Universae Theologiae Summa*, of which the only reliable ed. is that by the Franciscans of Quaracchi (1924 ff).

Alexander of Hillsborough, Albert Victor, 1st Viscount (1885–), politician, *b.* Weston-super-Mare, son of an engineer, ed. at St George Technical classes. A. was Labour-Co-operative M.P. for the Hillsborough div. of Sheffield, 1922–31 and 1935–50. He was First Lord of the Admiralty, 1929–31, in Ramsay MacDonald's first gov., and, again, in 1940, in the National Gov. of Winston Churchill, and in the Labour Gov. in 1945; Minister of Defence, 1947–50. In 1950 he was made a viscount. He was chancellor of the Duchy of Lancaster 1950–1.

Alexander of Tunis, Field Marshal Harold Rupert Leofric George A. 1st Earl (1891–), soldier, son of 4th Earl of Caledon, and educ. at Harrow and Sandhurst. In First World War he held a commission in the Irish Guards and was in the Mons retreat. Five times mentioned in dispatches. While still in his twenties he was put in command of the Baltic Landeswehr, a force of some 2000 men of Ger. stock, mainly Baltic barons and retainers, who were left behind in Riga after the Ger. evacuation. In 1934 he was given the command of a brigade in India, and served in 2 campaigns on the NW. Frontier. His name first came to be known in his own country when he was appointed to the command of the 1st Div. (1938). Two years later it was his task to control the final stages of the Dunkirk evacuation (1940), which he did with conspicuous gallantry and success. After holding the S. Command for a time he was appointed to command the army in Burma, where his skill contributed to

staying off any further Jap. advance in that country (1942). In Aug. 1942 he succeeded Gen. Auchinleck as Commander-in-Chief, Middle E. Here his presence was quickly felt, for very soon his strategy had its reward in the great victory of the Eighth Army under Gen. Montgomery at El Alamein, which completely reversed the position in Egypt and Libya; and this was followed by a series of victories on a smaller scale which took the Eighth Army into Tunisia, where A. had for some time been in command of the 18th Army Group. In May 1943 the entire Axis army under Gen. von Arnim was destroyed or taken prisoner. A. commanded the allied armies which defeated the It. and Ger. armies in Italy in 1944-5. C.S.I., 1936; K.C.B., 1942. Promoted general, 1942. Field Marshal, 1944. Raised to the peerage as Viscount of Tunis, 1946, became an earl, 1952. Governor-General and Commander-in-Chief Canada, 1946-52. Minister of Defence, 1952-4. *See also* AFRICA, NORTH, SECOND WORLD WAR, CAMPAIGNS IN, and ITALIAN FRONT, SECOND WORLD WAR, CAMPAIGNS ON.

Alexander Polyhistor, auct. Gk writer and philosopher of the 1st cent. BC.

Alexander Severus, *see* SEVERUS, MARCUS AURELIUS ALEXANDER.

Alexander the Aetolian, Gk poet who lived at Alexandria in the reign of Ptolemy Philadelphus (285-246 BC).

Alexandra Caroline Marie Charlotte Louise Julie (1844-1925), Queen of Great Britain and Ireland, wife of Edward VII. She was *b.* at Copenhagen, the eldest daughter of Christian IX of Denmark. She was married 10 Mar. 1863, and thence until the death of Queen Victoria in 1901 she was Princess of Wales. There were 5 children of the marriage, 2 boys and 3 girls. The eldest son, Albert Victor, Duke of Clarence, *d.* 1892, and his brother reigned as George V. A. was extremely popular in England; she had great charm, and showed a deep interest in charitable work of all kinds. She *d.* Sandringham. The bulk of the £230,000 raised in her memory was used to develop dist. nursing, and to provide pensions for queen's nurses. *See* Sir G. C. A. Arthur, *Queen Alexandra*, 1934.

Alexandra Feodorovna (1872-1918) (Alix Victoria Helen Louise Beatrice), last Empress of Russia, *b.* Darmstadt, daughter of Louis (IV), Grand Duke of Hesse. Her mother (Alicé, daughter of Queen Victoria) dying when she was 6, A. F. was brought up partly in England. She married Tsar Nicholas II, 1894. In 1904 an heir was *b.* Alexis, whose delicate health (haemophilia) occasioned the subjection of A. F. to Rasputin (q.v.). During the First World War she influenced Nicholas's policy for the worse, and was widely suspected of Ger. sympathies. When the empire fell she shared her husband's captivity. She was executed with him by the Bolsheviks at Yekaterinburg (Sverdlovsk) on 17 July 1918.

Alexandra Land, *see* NORTHERN TERRITORY.

Alexandra Park, place of recreation in the bor. of Wood Green, Middx, England, near the N. border of the co. of London. The park and a racecourse adjoining were opened in 1863. Alexandra Palace, a counterpart in N. London to the Crystal Palace at Sydenham, was opened on the grounds in 1873, burned down in the same year, and rebuilt (1875). It has been put to various uses, including the housing of internecine and gov. offices in the First World War, and latterly of the B.B.C. television studios (now transferred to Lime Grove, Shepherd's Bush) and their television transmitter.

Alexandre, Aaron (c. 1766-1850), noted Bavarian chess-player. He visited nearly all the European caps, and was the author of an *Encyclopaedia of Chess* and a book of *Chess Problems*.

Alexandrescu, Grigore (1810?-85), Rumanian poet. At school he had fallen under the spell of Fr. literature, and his work was particularly influenced by Boileau, Lafontaine, and Lamartine. His fables, epistles, and meditative poems were an important contribution to the development of Rumanian literature. He was a keen nationalist—he was imprisoned for his support of the nationalist opposition in Wallachia—and after the union he held sev. ministerial posts. All his activities were cut short by disease in 1860.

Alexandretta, or Iskanderun, tn of Asiatic Turkey. The sanjak of A. was formerly included in the dist. of Aleppo, N. Syria, but is now the vilayet of The Hatay. It owes its importance to its proximity to the Beilan Pass. It is the main port for the region, and has an extensive trade in tobacco, silk, cereals, liquorice, and textiles. Its climate is insalubrious owing to the marshy ground and the absence of purifying winds. Towards the end of the First World War it was occupied by Brit. and Fr. troops. After the war the sanjak of A., in recognition of the special interests of the large proportion of Turks in its pop., was accorded a special administrative regime. On 23 June 1939 France agreed to the complete cession of the sanjak to Turkey in consideration of the conclusion of a Franco-Turkish pact of assistance. Pop. 20,000.

Alexandria: 1. Chief seaport of Egypt. It was founded in 332 BC by Alexander the Great, and was for over 1000 years the cap. of the country. It is situated on a strip of land separating the Mediterranean from Lake Mareotis.

The Capital City. Originally the tn was built upon a mole called Heptastadium, which joined the isle of Pharos to the mainland. Since then sedimentary deposits have added considerably to the width of the mole. The buildings in the Brucheion (Gk) quarter included the royal palaces of the Ptolemies, the Great Theatre, afterwards utilised as a fortress by Caesar during the siege after the battle of Pharsalus, the Poseidonion, or temple to the god of the sea, the Timonium built by Antony, the Emporium or Exchange, the temple Caesareum, now lying underneath the new sea-wall, the Gymnasium,

the Palaestra, the mausoleum of Alexander, and the museum and library. The Necropolis lay to the W. A feature of the tn was the number of subterranean cisterns running along the spaces under the houses and capable of holding a supply of water sufficient to last the whole pop. a year. At the height of its prosperity it contained, according to Diodorus, approximately 300,000 free citizens, while it is probable that a still larger number represents the number of slaves. Placed as it was between the E. and W., it became a centre of commerce on that account. In 30 BC, on the death of Cleopatra, the last of the Ptolemies, it fell into the possession of the Romans. It was now at the zenith of its glory. A great centre of Hellenism, at the same time commercially prosperous to an extraordinary degree, and also the fountain of culture and intellect, A. can be said to have held at this time a position of unique and glorious splendour. For a long time it remained in an enviable position as the world's first port. But during the reign of Caracalla it sank considerably in its commercial greatness, and the rise of Constantinople only served to hasten its fall. Meanwhile Christianity had been introduced, and had quickly made headway. The subsequent struggle between Christianity and heathenism saw many bloody affrays, and in 389 the Serapeum, the last seat of heathenism, was captured and used thenceforth as a Christian church. Cairo was chosen by the Egyptian caliphs to be the cap. of Egypt; the passage round the Cape of Good Hope was discovered, as also was the continent of America: such significant events as these proved factors of deleterious influence upon A. Its decay seemed imminent. In 1517 it fell into the hands of the Turks, and presented but a shadow of its former beauty.

Signs of progress, however, were presently visible under Mehmet Ali. Much of its lost ground was recovered, so that to-day it is once more recognised as one of the most significant of Mediterranean ports. In 1882 Arabi Pasha incurred Brit. displeasure by his maltreatment of the Europeans during his rising, and a Brit. fleet was dispatched. The bombardment of A. followed, and of the few remaining emblems of antiquity most were utterly destroyed. This was not all. A few days later the tn was sacked and a disastrous fire ravaged a large portion of it. Among the scanty objects of antiquity that remain are Pompey's Pillar (so called in error) and 2 obelisks called Cleopatra's Needles, one of which is on the Thames Embankment, while the other is in New York.

The Modern City is built partly upon the isthmus which developed from the original mole by means of silt deposits, and partly upon a T-shaped peninsula. The Mahmudiya Canal, connecting A. with the Nile, runs at the S. of the tn, and by a series of locks enters the harbour. A.'s climate differs from that of the surrounding country. An almost incessant rain is experienced during the winter,

while the summer is rendered temperate by sea breezes. The chief exports are cotton, grain, beans, rice, etc. The prin. relics of antiquity are the so-called Pompey's Pillar, 88 ft high, the catacombs of Kom esh-Shuqafa, and the contents of the Museum of Graeco-Rom. Antiquities. A. suffered damage in frequent It. and Ger. air-raids in the Second World War. Pop. 925,081.

2. Tn of Dumbartonshire, Scotland, in Bonhill (q.v.) par., owing its existence to the cotton-bleaching and printing industries there.

3. Port and city of Virginia, U.S.A. It is accessible to the largest vessels, for the riv., which forms its harbour, though 100 m. from the mouth of the Potomac, is fully a m. wide. A. has railroad shops, freight yards, and naval ordnance plant, and manufs. chemicals, fertilisers, and metal products. Pop. 61,787.

4. City of Rapides par., Louisiana, U.S.A. Pop. 35,000.

Alexandrian Library, said to have been founded about 284 bc in consequence of the suggestions of Demetrius Phalerus, who had seen the public libraries at Athens. It was based on a collection of books formed by Ptolemy Soter, the first king of Egypt, probably the largest collection made before the invention of printing. Demetrius was appointed superintendent of the new estab., and he set about collecting the literature of all nations. Eusebius says that at the death of Ptolemy Philadelphus there were 100,000 vols. in the library. Together with the museum where the scholars lived and studied under royal patronage, it was situated in the Brucheion, the Gk quarter of Alexandria, while a smaller 'daughter' library was estab. in the Serapeum (q.v.). Successive librarians after Demetrius who encouraged the study of literature, philosophy, and the sciences were Zenodotus, Callimachus (q.v.), Eratosthenes, Apollonius, and Aristophanes of Byzantium.

In the siege of Alexandria by Julius Caesar a large part of the library was burnt, but it was re-estab. with the great library of MS. rolls from Pergamum, given to Cleopatra by Mark Antony, and continued to increase in size and reputation until it was dispersed in AD 390 at the destruction of the Serapeum by Theophilus, patriarch of Alexandria. Phoenix-like, the library rose again, according to the latest authorities, and Alexandria continued to flourish as one of the chief seats of literature, until conquered by the Muslims in AD 642, when the library was burnt by the order of Caliph Omar (see OMAR). See E. A. Parsons, *The Alexandrian Library*, 1952.

Alexandrian Liturgy, oriental liturgy of St Mark, which he is said to have arranged for the Christians of Egypt. See also LITURGY and RITE.

Alexandrian School and **Alexandrian Philosophy**. *Alexandrian School*. The loss of political independence by the Greeks resulted in the decline of their intellectual pre-eminence. Alexandria became instead the centre of literature,

science, and philosophy, a position which the city held for nearly a thousand years. This period may be divided into two—the first period extending from 323 to 30 BC, and the second from 30 BC to AD 640. The first period of intellectual supremacy was characterised by literature and science; the second by the speculative philosophy of the neo-Platonists and the religious philosophy of the Gnostics and early Christian Fathers: so that there were 2 A. S.s—the A. S. of Literature and Science and the A. S. of Philosophy.

The School of Literature and Science. Ptolemy Soter, who reigned in Egypt 323–285 BC, was a great patron of literature and science, and many Greeks of literary eminence gathered around him. With the help of Demetrius Phalereus, an Athenian orator, philosopher, statesman, and poet, he founded the Alexandrian library. Ptolemy also built the famous museum, where scholars lived, studied, and taught, and which was conducted on the lines of a modern univ. Every facility was given these learned men for their researches. Ptolemy Philadelphus (285–247 BC) extended the library by the addition of Aristotle's works and certain Jewish and Egyptian writings; and it is very probable that during his reign the O.T. was trans. into Greek. Ptolemy Evergetes (247–222 BC) added works from the archives of Athens to the library. The style of the A. S. differed widely from that of the anct Gk authors, whose writings gave evidence of that perfect freedom which they enjoyed. The members of the A. S. devoted their time to research and criticism, studying grammar, prosody, metre, mythology, antiquities, astronomy, and medicine. The result was that they wrote long epic poems on educational and other subjects. The *Argonautica* of Apollonius Rhodius (q.v.) and the *Alexandra* or *Cassandra* of Lycophron are some of the chief examples of the mythical works. Of the didactic epics the chief are Callimachus's *Heate*, fragments of which are extant; Nicander of Colophon's 2 medical works, entitled *Theriaca* and *Alexipharmaca*; and the *Phaenomena* of Aratus, a work on astronomy. Other epic poets were Dionysius, Euphorion, Rhianus, Dicaearchus, and Oppian. Of the elegiac poets Philetas of Cos, the tutor of Ptolemy Philadelphus, was the earliest; and Callimachus, of whose works only a few hymns, epigrams, and elegies remain, was the greatest. Among the lyric poets were Phanocles, Hermesianax, Alexander of Aetolia, and Lycophron. Epigrams were also written by the Alexandrians, and Timon the philosopher was the author of 3 books of lampoons. Tragedy, too, played an important part, but none of the works of the 7 great dramatists who were known as the Alexandrian Pleiades has been preserved. Theocritus was a celebrated bucolic poet, and his *Idylls*, which are pictures of the country life of the ordinary people, greatly influenced Rom. poets, especially Virgil. Besides the poets there were the critics and grammarians of the A. S., who gave to the world the anct Gk writings in

a form perfectly intelligible, for they devoted their time to criticism, the explanation of words, and the arrangement of the texts. Amongst these great critics were Zenodotus of Ephesus, Aristophanes of Byzantium, Aristarchus of Samothrace, Alexander of Aetolia, Lycophron, Callimachus and Eratosthenes. Mathematics, astronomy, geography, and medicine were also treated by the A. S. Of the mathematical school Euclid was the founder; and his pupils included Archimedes, whose inventions and discoveries were very important; Apollonius of Perga, the author of a work on conic sections; Hipparchus, the celebrated astronomer, whose catalogue of the stars is preserved by Ptolemy; and Eratosthenes, who wrote on astronomy, geometry, geography, and history.

The School of Philosophy. The members of this school brought together the philosophies of the E. and the W., and the Jewish notions of religion were very much influenced by Gk ideas. On this subject the reader is advised to consult Philo Judaeus. The founder of this neo-Platonic system (see NEO-PLATONISTS) was Plotinus, who was born about AD 203, and whose writings his disciple Porphyry rendered in their present form. Another celebrated teacher of this system was Proclus, sev. of whose works are still extant. The Gnostics (q.v.) were a sect who endeavoured to unite Christian and E. ideas. Clement of Alexandria and Origen showed leanings towards that heresy. Philo Judaeus made attempts to reconcile the Jewish scriptures with the doctrines of the Platonic philosophy and sev. of his works have been handed down to us.

Alexandrina, Lake, shallow lake (area 220 sq. m.) in S. Australia, at the mouth of the Murray R.

Alexandrine Verse, species of verse much employed by Fr. poets, especially in poetry of the heroic or epic order. Each line in the A. consists of 12 syllables, and strictly speaking, and following the Fr. model, it should be divided into 2 hemistichs, the sixth syllable ending a word. The name A. would appear to be derived from an old Fr. poem about Alexander the Great, written in this metre towards the end of the 12th cent. It is used in English as the concluding line of the Spenserian stanza, and also as a variant in poems written in the 10-syllabled heroic couplet. Pope railed against it in his well-known couplet:

'A needless Alexandrine ends the song,
That, like a wounded snake, drags its
slow length along.'

But for all that he employed it not infrequently. Two long Eng. poems written wholly in A.s are Drayton's *Polyolbion* and Browning's *Fifine at the Fair*.

Alexandrinus, Codex, MS. of the O.T. and N.T., in Gk, now in the Brit. Museum. The MS. is in 4 vols., large quarto, the N.T. being the last vol. It is written on vellum, in double columns, in uncial or cap. letters, without spaces between the words, accents, or marks of

aspiration. The letters are round and well formed, a few words are abbreviated, and the MS. is in fairly good condition. Its date is probably about 450. In 1628 it was sent by Cyrillus Lucaris, patriarch of Alexandria and of Constantinople, to Charles I. and placed in the Royal Library. In 1753 it was transferred with this library to the Brit. Museum. A facsimile of the O.T. was pub. by the Rev. H. Baber of the Brit. Museum (1816-28), and of the N.T. by Dr Woide (1786), and a second ed. by Spohn.

OYTOLLEYIOIANALHOUN WAIGH
 SEMAYOYHATHIRANE
 OYTOLLEYIOIANHOUN AMALA
 KALASBANHATHIRAN KALAZAR
 OYTOLLEYIOIOGAR SEMALAN KAL
 ZOYKAM KALHUYIGEM KALUYK
 OYTOLLEYIOIOICSHINCHIKAY
 OYTOLHUMOMESYORHUI
 HTEMUN AUTAN
 HTEMUN OUBLA
 HTEMUN OUBELUN
 HTEMUN ANA
 HTEMUN AKSHIN
 HTEMUN OAR
 HTEMUN PAIGUN
 OYTHINGHOMESYORHOUNTHO
 HTEMONHIXAYTHINGHEDAM
 KAYTHIOIOIKALHIOICASHOY
 THSENGKAMTHIOIYELKAY
 SAKKACHALENINIM
 KALABOALUYSONHOMKUNHAKK
 IOICHTYELSHOIKALHOMKUN
 POASHATTOYUYNABA KHOU
 NONAKELAK KALASAKHUYON
 ANTHATTOYHUEALYIOICARAK
 SOGUPPAK LPHUANUMAKHAK
 KALABALUYCHINANTHATTOYKUN
 KENHCHAMAMU
 PEBANEMALASON KALABAKHAK
 ANTHATTOYUYNCHIKARAK OOK
 KUTASMAHAMENCHIKALHIOICAMU

W. F. Mansell

FROM THE CODEX ALEXANDRINUS

Alexandropol. *see* LENINAKAN.

Alexandropolis, formerly **Dedeagach**, Gk port, cap. of Evros nome, W. Thrace, on the Aegean Sea, 65 m. SW. of Edirne and near the border with Turkey. Once a small fishing vil., A. grew in importance after the completion of the Salonika-Istanbul railways (1896). It became a part of Greece after the First World War, and was renamed A. Pop. 19,400.

Alexandrovsk, *see* ZAPOROZH'YE.

Alexiad, *see* ANNA COMNENA.

Alexis (Russian **Alexey**) **Mikhailovich** (1629-76), Tsar of Muscovy (from 1645), second of the house of Romanov, father of Peter the Great. He was good-natured (nicknamed 'the Silent') and pious. During his reign a code of laws was compiled which remained in force until the 18th cent.; prayer books were revised by Patriarch Nikon, leading to a schism in the Russian Church; attempts were made to reorganise the army on W. European lines, and to estab. a regular postal service; the Ukraine was re-

united with Muscovy; Russian possessions in Siberia were enlarged; successful wars were waged against Poland. There were sev. rebellions during A. M.'s reign, including the great uprising led by Stenka Razin (q.v.).

Alexis (Russian **Alexey**) **Petrovich** (1690-1718), son of Peter the Great. He was hostile to the reforms introduced by his father, fled from Russia but returned; he was sentenced to death and *d.* in prison before execution as a result of torture, possibly by his father, during interrogation.

Alexis, Willibald, pseudonym of the Ger. novelist Georg Wilhelm Häring (1798–1871), b. Breslau. The work that brought him into prominence was an historical romance entitled *Walladmor* (1823), pub. as being a trans. of Sir Walter Scott. De Quincy trans. the novel into English, and Scott himself approved of it. Two more romances were pub. under the same pretence, *Die Geächteten* and *Schloss Avalon*, 1827. His other noted works are *Cabanis*, 1832, *Der Falsche Woldeemar*, 1842, and *Hans Jürgen* and *Hans Jochem*, 1846–8. His best novels are those dealing with the history of Brandenburg. He wrote also 2 comedies, *Prinz von Pisa*, 1828, and *Annen von Tharau*, 1829.

Alexius I, Comnenus (1048–1118), Byzantine emperor, succeeded 1081 after a military revolt. His military and diplomatic skill did much to delay the break-up of the E. Empire. He allied with Venice to curb the Normans in Albania, and in 1116 won a great victory over the Seljuk Turks in the E.

Alexius Angelus, name of Alexius III (1195-1203) and Alexius IV (1203-4), Byzantine emperors. Under Alexius IV Constantinople was taken by the Venetian and Fr. crusaders.

Alfa, see ESPARTO GRASS.

Alfadir, 'all-father,' appellation of Odin in Scandinavian mythology.

Alfalfa, the Amer. name for *Medicago sativa*, or lucerne as it is called in England. The plant has a wide distribution in the Old World, but was not introduced to America till the 18th cent. A. is now grown as a forage crop on a worldwide scale, with the U.S.A. and Argentine as its greatest cultivators. However, it is becoming increasingly important in Great Britain. It has trifoliate leaves and small purple flowers similar to those of many other legumes.

Alfano, Franco (1876-1954). Italian composer, b. Naples. He studied the piano and at Leipzig. Among his works are ballets, 2 symphonies, and other orchestral music, chamber music, and songs, but he was best known by his 12 operas, including *Risurrezione* (after Tolstoy), *L'ombra di Don Giovanni*, *La Leggenda di Sacralata* (after Kalidasa), and *Cyramo di Bergerac* (after Rostand), and better still by the completion of Puccini's *Turandot* entrusted to him by Toscanini.

Alfieri, Vittorio (1749-1803), eminent It. dramatist, *b.* Piedmont. He studied at the Accademia in Turin. Succeeding to a great fortune, he travelled extensively and had numerous love-affairs, the most

important being with the wife of Charles Edward Stuart, the Young Pretender. He wrote his first tragedy, *Cleopatra*, at the age of 25, and thereafter devoted himself to drama, mainly inspired by the fight for political freedom. His fame rests chiefly on his tragedies, among them *Abele*, *Filippo*, *Maria Stuarda*, and *Saul*. He wrote also a number of comedies (*L'Uno, I Pochi, I Troppi*), satires, and sonnets, and a masterly autobiography.

Alföld, great plain of Hungary, lying between the Danube and the Carpathians (q.v.). Parts of it were taken from Hungary by the treaty of Trianon (q.v.) and now belong to W. Rumania and N. Yugoslavia (see BANAT). The land, called *pusztá*, is traditionally barren, but extensive irrigation schemes are now in operation, particularly that stemming from the damming of the Tisza (q.v.) at Tiszalök. Cereals, vines, tobacco, hemp, and flax are produced, and live-stock is reared.

Alfonsine Tables, see ALPHONSINE TABLES.

Alfonso, name of 5 kings of Aragon (q.v.). Those mentioned below are the most important.

Alfonso I (1104-34), married to the widow of Raymond of Burgundy (q.v.) in order to unite the 2 great Christian states against the Moors. His violent quarrels with her led to civil war. He gained the title of the Battler from his great battles with the Moors.

Alfonso II (1162-96), christened Ramon, adopted this name in order to please the Aragonese. He was ruler of Aragon and ter. in SE. France.

Alfonso V, the Magnanimous (1416-1458), King of Aragon, Sicily, and Naples. A patron of men of letters and one of the conspicuous figures in the Renaissance.

Alfonso, name of 11 kings of Leon and Castile. Of the first 5 kings of this name very little is known, much of the information about them that exists being based on later legends. The most important later kings of this name are noted briefly below.

Alfonso VI (1065-1109), the Brave, a leader of organised resistance to the Moors. He was, however, defeated by the Almoravides at Zalaca in 1086.

Alfonso VII (1126-57), 'the king of the men of two religions.' He strove for unity of his realms and protected the Moors. He was killed trying to check a Moorish rising.

Alfonso VIII (1158-1214), King of Castile and leader of the Christian coalition that broke the power of the Moors. He married a daughter of Henry II of England.

Alfonso X (1252-84), 'El Sabio' (the Learned), gave great encouragement to the study of astronomy, and was a patron of the arts. His rule was lax, however, and the nobles gained a good deal of power at the expense of the crown during his reign.

Alfonso XI (1312-50), the Avenger, is noted chiefly for the ruthless manner in which he repressed his rebellious nobles, and for the defeat of the last Moorish invasion from Africa.

Alfonso, name of 6 kings of Portugal:

Alfonso I (1139-85) succeeded in establishing the independence of Portugal, which up to this time was a dependency of Leon. A great warrior and a man of gigantic stature, he distinguished himself in many battles against the Moors.

Alfonso II (1211-23), noted chiefly for his endeavours to weaken the power of the clergy, in the course of which he was excommunicated, and for the code of law which he introduced.

Alfonso III (1248-79). His reign was taken up principally in fighting the Moors.

Alfonso IV (1325-57). Wars with Castile and the Moors occupied most of his reign. Civil war broke out between himself and his son Pedro as a result of the barbarous murder of Inez de Castro (Pedro's wife).

Alfonso V (1438-81), usually called 'Africano,' a name which he gained for himself by invading the territories of the Moors in Africa.

Alfonso VI (1656-67). Forced on account of his vices to abdicate in 1667, he retired to Terceira, where he d. in 1675.

Alfonso XII, King of Spain (1875-1885), son of Isabella II. In 1868 he accompanied his mother into exile, and in 1870 she abdicated in his favour. While continuing his education at Sandhurst in 1874 he issued a manifesto proclaiming himself the only representative of the Sp. monarchy. In the following year he entered Spain, being received with enthusiasm, and in 1876 suppressed a Carlist rebellion.

Alfonso XIII (1886-1941), King of Spain, son of A. XII, b. posthumously. His mother, Queen Maria Christina, formerly an Austrian archduchess, acted as regent until 1906. In 1906 he married Princess Victoria Eugenie of Battenberg, niece of Edward VII, and narrowly escaped assassination on the day of his marriage. During A.'s minority, Spain lost her colonial empire as a result of war with the U.S.A. Notable features of policy in Spain during his reign were her neutrality during the First World War, and her campaign in Morocco—which created trouble at home that led to the suspension of the constitution in 1923. His assassination was attempted sev. times. In 1930-1, following the death of the dictator, Primo de Rivera (whom A. had supported), the Republican party rapidly gained in political influence until, in April 1931, they carried the day at the polls. To avert the danger of civil war A. left the country, though he did not renounce his monarchical rights until a few weeks before his death, when he named his third son, Don Juan, as his successor to the Sp. crown 'when Spain judges it opportune.' See S. Erskine, *Twenty-nine Years: the Reign of King Alfonso XIII of Spain*, 1931, and a life by R. Seneourt, 1942.

Alford, Henry (1810-71). Eng. divine and scholar. He showed early promise of extraordinary abilities, for at the age of 10 he had written sev. Lat. odes and a hist. of the Jews. He entered Cambridge in 1829. Shortly afterwards he issued his first vol., entitled *Poems and Poetical*

Fragments. The School of the Heart, and other Poems followed. His great work, his critical ed. of the *Greek Testament* in 4 vols., was pub. between 1849 and 1861. In 1835 he became vicar of Wymeswold in Leics. His scholarly and erudite *Chapters on the Greek Poets* now appeared. In 1857 he was appointed Dean of Canterbury.

Alford, vil. in Aberdeenshire, Scotland, where the Covenanters were defeated by Montrose, 1645. Pop. 1248.

Alford, mkt. tn. of Lincs, England, 22 m. N.E. of Boston. Pop. 2500.

Alfort, see MAISONS-ALFORT.

Alfraganus, or **Al-farghāni**, Arabian astronomer who fl. in the early part of the 9th cent. He was the first among the Arabian astronomers to enumerate the small stellar groups, and he wrote a treatise on the elements of astronomy.

Alfred Ernest Albert (1844-1900), Duke of Saxe-Coburg and Gotha and Duke of Edinburgh, second son of Queen Victoria. On the deposition of Otto he was unanimously invited by the Greeks to become their king, but political difficulties of long standing rendered it impossible. He was created Duke of Edinburgh in 1865; rear-admiral in 1878; and Commander-in-Chief at Devonport (1890-3). He succeeded to the Duchy of Saxe-Coburg and Gotha in 1893, surrendering his privileges as an Eng. peer.

Alfred of Beverley, see ALURED.

Alfred the Great (c. 849-99), Eng. king, b. Wantage, son of Ethelwulf, King of Wessex. In 853 and in 855 he was taken on pilgrimage to Rome. Even before his accession to the throne he was in conflict with the Danes, and he assisted his brother Ethelred right down to Ethelred's death. He was the youngest son of Ethelwulf, and succeeded on the death of his elder brother (871). The first years of his reign were constantly occupied in fighting the Danes under Guthrum. For 7 years A. fought, bargained, and treated with the Danes in a vain endeavour to give his kingdom respite from the constant war and bloodshed which it had endured. In 878 A. was driven into the woods and swamps of Somerset, and remained in hiding at Athelney until he felt strong enough to attack the Danes again. At Edington in Wilts in 878 he utterly defeated the Dan. invaders after a stubborn struggle, driving them back to their fortifications at Chippenham. After 2 weeks' siege the Danes agreed to terms, generally known as the treaty of Wedmore. Guthrum was baptised, the country was divided up; N. and E. of a line drawn roughly from Chester to London became the Danelaw (q.v.). S. and W. remained Wessex. The decisive victory at Edington arrested the flowing tide of Dan. conquest and brought nearer a united Eng. kingdom. For the greater part of the rest of his reign A. was able to attend to the pressing domestic affairs of his kingdom. The army was reorganised, a navy recognised as an absolute necessity, justice was reformed, education received attention. By means of his navy A. was

able to attack the Danes on the sea and in their strongholds, but this policy of a strong navy was neglected by his successors. To his court A. invited learned men from all parts of Europe. Chief amongst these were Asser, Werth, and Plegmund. From his reign dates the beginning of Eng. prose literature, and the hist. of Orosius, the *Consolation* of Boethius, the *Pastoral Care* of Gregory, and Bede's *Ecclesiastical History* are all trans. by A. himself. The *Anglo-Saxon Chronicle* was probably begun in its final form under his influence. He issued also a code of laws, compiled on the lines of the code of Ine and Offa. In 884 A. again defeated the Danes. In 892 a Dan. army under Hasting attacked Wessex, and although A. inflicted sev. defeats on the Danes desultory fighting continued up to A.'s death. These inconclusive later wars should not obscure the fact that A.'s earlier victories had undoubtedly saved Eng. learning and culture from extinction. A. combined the qualities of a military leader and great administrator with a sincere piety and love of learning. He has been called the most effective W. European ruler since Charlemagne. See *Anglo-Saxon Chronicle*; C. Plummer, *Life and Times of Alfred the Great*, 1902; F. C. Hayward, *Alfred the Great*, 1936; F. M. Stenton, *Anglo-Saxon England*, 1943.

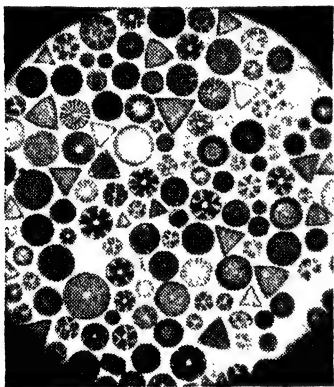
Alfreton, tn in Derbyshire, England, 14 m. from Derby, noted as a market centre. Coal-mining is the chief industry, and there are hosiery and textile factories and engineering works. Pop. 23,300.

Alifuras, or **Harafuras**, aboriginals of Celebes, but inhab. also of Buru, Ceram, and New Guinea, and said to be of Malayan or Indonesian extraction.

Algae (Lat. *alga*, seaweed), with the fungi, form the div. of the vegetable kingdom known as the Thallophyta, but differ in possessing chlorophyll, though sometimes masked by other colours. A. enter into symbiotic partnership with fungi to form lichens. A., like fungi, have as their body a *thallus*, which is a relatively simple structure. This may consist of a single cell, a row of cells, a plate of cells, one cell thick, or a body sev. cells thick with structures like stems and branches, as in seaweeds (q.v.). A. are divided into Chlorophyceae or green A., Cyanophyceae or blue-green A., Phaeophyceae or brown A., Rhodophyceae, red A., and Diatomaceae, usually yellowish brown. A. reproduce by sexual or asexual spores; in the former, gametes sometimes unite in isogamous conjugation, i.e. with similar gametes; but also in heterogamous conjugation, when a male unites with a female gamete; in the latter often by means of ciliated spores able to move in water.

The *Pleurococcus* is a unicellular green alga that appears on tree trunks, multiplying by cell div. to form a green powdery growth, and reproducing by biciliate spores and isogamy. *Spirogyra* forms slimy masses in ponds and lakes, each alga consisting of sev. cells united to form a filament; each cell is complete in

itself and the filament has no attachment and no distinction of base and apex. *Spirogyra* is isogamous; 2 adjoining filaments send out processes from their cells which fuse on meeting, forming a tube through which the gamete of one cell can pass to another cell and there unite with a similar gamete. *Oedogonium* is also a filamentous green alga, growing attached to stones in ponds; it may reproduce by multiciliate spores, attaching themselves to stones and forming new filaments, or sexually, by forming sexual organs on the same or separate filaments, consisting of the male antheridium, formed by cell div. and producing 2 spermatozooids with large



GROUP OF DIATOMS

nuclei and many cilia; and the female oogonium, a rounded protoplasmic ovum. The spermatozoid swims down a passage to the ovum, uniting in an oöspore which usually gives rise to 4 zoöspores with cilia, that break free, swim about, and finally form new plants. Thus the green A. vary greatly in structure and reproductive processes. There is similar variation in other A.

A. are found in damp places, such as damp tree trunks, surface of moist soils, damp rock, etc., as well as in pools and streams. *Chlorophyceae*, *Phaeophyceae*, and *Rhodophyceae* are marine A., the last 2 comprising most of the seaweeds (q.v.). *Cyanophyceae* are found in fresh and sea water, reproducing chiefly by spores or by div. of a filament at a cell called a *heterocyst*—a large cell containing food material. Diatoms are highly important constituents of *plankton*, the life of surface waters, and consist of single-cell organisms encased in delicate skeletons of silica, often beautifully ornamented and in 2 halves, fitting together like the lid on a pill-box. See F. Wille, *Freshwater Algae*, 1887; C. S. West, *Freshwater British Algae*, revised by F. E. Fritsch, 1932; F. E. Fritsch,

Structure and Reproduction of the Algae (2 vols.), 1935-45; D. H. Scott and F. T. Brooks, *Structural Botany*, vol. II, 1948.

Algardi, Alessandro (1602-54). It. sculptor and architect, b. Bologna. He was a pupil of Giulio Cesare Conventi. He first worked in Mantua, but afterwards went to Rome, where he executed 2 statues in stucco for the Capella Rondini in the church of San Silvestro. His prin. works are the colossal group in marble, representing the decapitation of St Paul, for the church of the Barnabite Fathers at Bologna; the monument of Leo XI, and 'Attila checked by St Leo,' in St Peter's; and the bronze statue of Innocent X.

Algaroba, or **Algarroba** (from Arabic *al*, the, and *kharroub*, carob-tree, or from *Algarrobo*, a tree in Andalusia), carob-tree, *Ceratonia siliqua* (q.v.), and bean; also S. Amer. species *Prosopis juliflora* (family Leguminosae), known as the mesquite-tree.

Algarotti, Francesco, Count (1712-64), It. philosopher and writer on art. He was educ. at Rome and Bologna. He became acquainted with Voltaire in Paris, and thus formed a long friendship. He produced in Paris *Newtonianismo per le dame*, a work on optics. In 1740 he was made a count of Prussia by Frederick the Great and lived in Berlin for some time. His chief work on art was his vol. of 'Essays.'

Algarve, most southerly prov. of Portugal, co-extensive with Faro dist. (q.v.). It is bordered on the E. by Spain, and on the W. and S. by the Atlantic. Parts of the prov. were successively in the hands of the Phoenicians, Romans, and Visigoths (q.v.). In 1140 it became a Moorish kingdom, and it was the last stronghold of the Moors (q.v.) in Portugal. It was taken by Alfonso III (q.v.) in 1249. Fruit and wine are produced, and there is fishing and salt-making; the inhab. have a long seafaring tradition. The prin. tn is Faro. Area 1958 sq. m.; pop. 326,000.

Algebra, system of mathematical calculations where quantities are designated by symbols, usually letters of the alphabet. In ordinary A. the same operations are carried on as in arithmetic, but the symbols being capable of a more generalised and extended meaning than the figures used in arithmetic, it facilitates calculation where the numerical values are not known, or are inconveniently large or small, or where it is desirable to keep them in an analysed form. Addition is denoted by + and subtraction by -; $a+b$ and $a-b$ thus represent the addition to a and the subtraction from a of the quantity b , respectively. The results may enter into subsequent calculations as $(a+b)$ and $(a-b)$. Multiplication is denoted by \times , or by putting the symbols together, thus $a \times b = ab$; div. is denoted by \div or the use of the fractional form, thus $a \div b = \frac{a}{b}$ or frequently

a/b . Involution, or the multiplication of the same quantity, is shown by the use of

small numbers, or indices; thus $aaaa = a^4$.

Therefore $a^4 \times a^3 = a^7$; $a^5 \div a^2 = \frac{1}{a^3}$ or a^{-3} .

Evolution is denoted by the use of radical signs or of fractional indices; thus the seventh root of $a = \sqrt[7]{a}$ or $a^{\frac{1}{7}}$.

Negative quantities commonly enter into algebraic calculation. Thus if the value of a symbol be represented by the distance in a given direction of a point from a fixed point, the corresponding negative symbol represents an equal extension in the opposite direction. Imaginary quantities, such as the square root of a negative number, can also be symbolised and used in A.

A. was probably known in a rudimentary form to the anc. Egyptians, but the earliest W. work on the subject was written by Diophantus of Alexandria about AD 350. The Hindus had developed A., however, to a point far beyond the achievements of Diophantus. From them the Arabs brought the system to the W., and Al-Khwarizmi (q.v.), c. AD 820, wrote a work entitled *Al-jabr wa'lmuqabala*, from which the word 'algebra' has been derived. In 1202 an It. merchant, Leonardo di Pisa, reintroduced the study of A. into Europe, where it had declined since the fall of the Rom. Empire. The solution of cubic equations and biquadratic equations was accomplished by the 16th cent., and in the 17th Franciscus Vieta used symbols for known quantities as well as unknown, and introduced such terms as *affirmative*, *negative*, and *co-efficient*. Descartes, the famous Fr. philosopher, connected A. with geometry in 1637, and did much to extend the theory of equations. The discovery of logarithms by Napier and of the calculus by Newton and Leibnitz, and the development of differential equations by Gauss and Riemann, prepared the way for Einstein's theory of relativity, and for a modern higher A. which has proved to be the tool and to some extent the inspiration of recent research in the fields of atomic energy and radio.

See also BINOMIAL; COEFFICIENT; DETERMINANTS; ELIMINATION; EQUATION; FIGURATE NUMBERS; FUNCTION; INDETERMINATE; INVOLUTION; NUMBERS; THEORY OF; QUADRATIC EQUATION; SERIES; SURDS.

Algeciras, Sp. tn in the prov. of Cádiz, on the Bay of Gibraltar. In 1906 a conference of European powers was held here to settle Moroccan affairs (see MOROCCO, *History*), and France and Spain were entrusted with the task of preserving order in Morocco. The 'Agadir incident' (see AGADIR) in 1911 arose from a presumed Ger. breach of this agreement. During the Civil war of 1936-9 the tn was bombarded by republican warships (1936). A. has ferry services to Tangier, Ceuta, and Gibraltar, and is a popular resort. Leather and charcoal are produced. Pop. 45,000.

Alger, Russell Alexander (1836-1907), Amer. soldier and politician, b. Medina co., Ohio. At the outbreak of the Civil war he enlisted in a cavalry regiment,

distinguishing himself in the Gettysburg campaign. He was secretary of war under McKinley, and was criticised for extravagance; he replied in his book, *The Spanish-American War*, 1901. He was elected senator in 1902.

Algeria, Fr. ter. of N. Africa, bounded on the W. by Morocco, on the E. by Tunisia and Libya, on the S. by Fr. W. Africa. A. has a Mediterranean littoral of 625 sq. m. The area of A. is 851,299 sq. m. divided into 2 regions, N. A. (80,938 sq. m.) and the S. ters., which include the Algerian parts of the Sahara Desert (770,361 sq. m.). N. A. is a mountainous mass divided into 3 zones by the 3 ranges of the Atlas Mts: the Tell Atlas, the High Plateaux, and the Saharan Atlas. This area is in the temperate zone. A. forms a group of Fr. *départements*, and as such is administered as an integral part of the metropolitan country. The pop. (Jan. 1957) was officially stated to be 1,200,000 Europeans, mostly of Fr. origin, and 8,300,000 Muslims, consisting of Berbers (i.e. Kabyles, Tuaregs, Mozabites, Aurasiens) and Arabs who are now freely intermingled with the Berbers. There is also a large Jewish pop. In May 1846 full citizenship was granted to all Algerian Muslims. In Sept. 1847 the full rights pertaining to the status of a Fr. citizen were guaranteed to all the inhab., and an Algerian Assembly was created possessing a considerable degree of legislative autonomy. The Assembly consists of 120 members who are elected by 2 colleges. To the first college belong all citizens of Fr. status and Muslims who have acquired such a status by certain military, academic, or other analogous qualifications. The second college is composed of all other Muslim citizens. Members of the Assembly are elected for 6 years, and the 2 colleges each elect 60 members. In the National Assembly A. is represented by 30 seats; 14 in the Council of the Rep.; and 18 in the Assembly of the Fr. Union. These seats are divided equally between the electoral colleges. A. belongs to a customs union with metropolitan France, and the exchange of agric. and mineral products for industrial equipment and food products constitutes the main item of trade. The trade deficit in 1954 was 78,000 million francs, attributed largely to the heavy increase of capital goods required for industrial development and the general increase in living standards. Direct grants and loans from France alone totalled 33,000 million francs in 1954, and in 1955 were estimated at 46,000 million francs. The main exports are wine, iron ore, citrus fruit, cereals, spring vegetables, and phosphates; and in 1954 the total value of exports was 140,000 million francs (imports 218,000 million francs).

A. may well become an immensely rich country following the discovery since 1952 of immense deposits of oil at Hassi Messaoud near Ouazgla, estimated at between 200 million and 1000 million tons. A pipeline to either the Tunisian

or Algerian coast will cost about £35 million (1956 estimate). Until the pipeline is laid the oil will be taken 100 m. by lorry to Touggourt, and thence by rail to Philippeville on the coast. Oil has also been found close to the Libyan border. Great deposits of natural gas have also been discovered S. of In Salah, a particularly barren part of the Sahara. S.E. of Tindouf the deposits of iron ore are said to rank among the world's 5 largest; it is easy to mine and has an average consistency of 54 per cent, which is equal to second grade Swedish ore. Again transport presents a great difficulty and will require large capital and the perpetual goodwill of Morocco, through whose territory a railway would have to run. In Mauretania, at Fort Gouraud, even higher quality ore has been found. In all these projects international interest has been encouraged by France. However, given that the exploitation of A.'s mineral deposits is economically feasible, and no serious suggestions are made to the contrary, A. in the meanwhile can only be regarded as a poor country, but with rich potentialities. Its present natural resources barely sustain its pop., which has increased from 2,000,000 in 1830 to 8,300,000 in 1957 (Muslims). It is estimated that the net natural increase of the pop. in 1954 was 240,000. European landowners, who numbered 22,037 in 1956, held 2,726,666 hectares, and 632,000 Muslim landowners 7,349,166 hectares, of which 6,000,000 are cultivated. Much of the best land is owned by the Europeans, and this is justified by the French on the grounds that most of this represents land which was reclaimed from swamps and never in beneficial occupation. (According to Muslim law previously uncultivated land which has been developed normally belongs to those who cultivate it.) Soil conservation and irrigation schemes carried out since 1937 include the construction of 12 major dams and nearly 2000 m. of canals. In agriculture and in industry, as well as in public works, France has invested vast sums of money.

Communications. In 1955 there were 15,534 m. of all-weather roads; 29,576 m. of other roads and tracks; and a further 3976 m. under construction. Railway lines totalled 2776 m. of track, and in 1954 ran 784,371.089 ton goods m. and 541,000,000 passenger m. A. is served by 4 international airports at Algiers, Oran, Bone, and Aoulouf. There are in addition 34 other aerodromes, 14 of which are classified as secondary.

Education. One-sixth of the ann. budget is set aside for education, in 1955 estimated at 16,800 million francs in addition to 5700 million francs for building and equipping schools. Nevertheless in 1956 only 523,000 children were attending schools, of whom 350,000 were Muslims. It is estimated that another 80,000 million francs is required to provide the accommodation for all children of school age. Secondary education is given in 49 *lycées* which were attended in 1954 by 35,000 pupils of

whom 4101 reached matriculation standard. There are 3 technical institutes and 11 technical depts attached to high schools. The Univ. of Algiers ranks third among Fr. univs. and is attended by some 5000 students. A commercial training school is attached to the univ.

Health. Typhus, which was a major scourge, appears to have been eliminated. Malaria is no longer common, but tuberculosis is widespread. In 1954, 3,364,560 persons were examined for tuberculosis. Trachoma is also common, especially in the S. Mobile ophthalmological units are extensively used to combat the disease. In 1956 there were 148 hospitals with a total of 30,000 beds. The Public Health Dept employed 200 doctors, and another 1800 doctors were in private practice or serving in the army. Military hospitals and infirmaries are available to the public in remote areas or in an emergency. The general budget is responsible for the cost of free medical assistance, a reform which took place in July 1956. The average yearly expenditure per person on health services is 1034 francs. The infant mortality rate is 8.5 per cent as against an estimated 50 per cent a century ago.

History. The Phoenicians founded trading settlements on the coast, and Carthage estab. her rule over the E. region. The Romans superseded the Phoenicians, conquering the ter. They penetrated into what is now desert, and allegedly Rom. remains are to be found as far S. as In Salah. The Berbers had more or less embraced the Christian faith by the 5th cent., and in the 6th cent. the Vandals invaded and partially occupied A. This era was followed by the Byzantine re-conquest; but during the 7th cent. the Arabs incorporated the coastal regions into the Muslim world, and the inhab. turned to Islam. Until the 11th cent. A. enjoyed comparative prosperity. It came to an end with the invasion of the Nomad Hilals from Egypt, who seriously disrupted the Berber kingdoms which were by this time well estab. Early in the 16th cent. the tn and harbour of Algiers were held by the Turks, becoming the cap. of a state under suzerainty of Stambul. Algiers became the notorious H.Q. of the Corsairs (pirates), of whom Horuk Barbarossa was the best known. Various expeditions by the maritime powers—England, Holland, France, Spain, and later America—failed to keep the pirates in check. Eventually, in 1830, Algiers was bombarded into submission by the Fr. fleet under the command of Gen. Clausel. It was 53 years before the whole of A. was finally subdued and general tranquillity estab.

Dissatisfaction with Fr. racial policy and the tardiness of necessary reforms led to general disaffection and to the estab. of a militant revolutionary movement, the 'Étoile Nord-Africaine' (N. African Star), under the leadership of Messali Hadj, formerly a member of the Communist party. The N. African Star became a branch of the 'Secours Rouge

International' in Mar. 1926. The objective of the organisation was to launch by all possible means, including violence, a social and political rebellion. Rapidly local conditions influenced the organisation and both nationalism and religious fanaticism began to get out of hand. For the first 10 years of its existence the N. African Star movement was apparently confined to Algerians living in France; in 1937 it became the 'Parti Populaire Algérien' (Algerian People's Party), which was banned in 1939 because of its Communist associations.

Until the liberation of France in 1944, the Free Fr. H.Q. was in A. On 8 Nov. 1942 a great Anglo-Amer. expeditionary force under the supreme command of Gen. Eisenhower landed at various ports in A. and Fr. Morocco. After 3 days Adm. Darlan surrendered; he was assassinated soon afterwards.

In the year of the Fr. liberation, political activity again sprang up in A. In Aug. 1944 another group was created under the leadership of Ferhat Abbas and named 'Les Amis du Manifeste Algérien' (Friends of the Algerian Manifesto). The Algerian People's Party, which had gone underground after being banned, reappeared in 1946 as the 'Mouvement pour le Triomphe des Libertés Démocratiques' or M.T.L.D. (Movement for the Triumph of Democratic Freedoms). The Friends of the Algerian Manifesto now became virtually an appendage of the M.T.L.D. and took an active part in the subsequent uprisings. (Between 1 Nov. 1954 and 31 Dec. 1956 5344 civilians were murdered, of whom 4149 were Muslims.)

Active training in sabotage and terrorism by the rebels was carried out with a strong admixture of the ideals of nationalism or communism, according to the politics of the rival organisations, of which there were several in 1946. For instance, the 'Front de Libération Nationale,' or F.L.N. (National Liberation Front), with H.Q. in Cairo, claimed to have cut the throats of 18 Muslims, members of the M.N.A. (National Algerian Movement). The mutual antagonism of various anti-gov. parties is one of the major phenomena of the Algerian insurrection. In 1957 there were probably 6 or 7 separate but active quasi-military parties. According to official Fr. sources only the M.N.A. appears to be an exclusively Algerian movement; the others are all in some way supported by Egypt, other Arab countries, or international communism.

The active participation and encouragement of Egypt have been proved on many occasions. For instance, on 16 Oct. 1956 the 400-ton yacht *Athos*, formerly *Il Briavels*, was seized on its way from Alexandria to the Bay of Boufades in A. The crew were armed and the ship's papers not in order. The cargo consisted of nearly 100 tons of arms intended for the rebel leaders of the Turenne underground group. Much of the material was manuf. in India after 1953. Egyptian complicity is no longer covert, and

assistance has taken the form of the actual training of terrorists, incessant propaganda by every modern method, and the supply of arms and financial aid. Both Morocco and Tunisia afford active assistance to the rebels.

At the end of 1956 there were said to be 400,000 troops engaged in an effort to restore law and order in A. Nevertheless, during the 6 months from Nov. 1955 to May 1956, large numbers of schools, bridges, gov. buildings in forest areas,



E.N.A.

AN ARAB CAID, ALGERIA

medical and social centres, railway depots, and buildings occupied by post offices were destroyed. Since then there has been a large increase in destruction. In addition sev. hundred farms have had their farm buildings destroyed, and much damage has been caused to crops, forests, and vineyards. The French have offered to carry out democratic elections and invite foreign observers to attend the elections, and to do away with the 2-college system within a reasonable time after the cessation of the insurrection. Other reforms have been promised. The restoration of political stability is obviously necessary if France and A. are to benefit fully from the recent discoveries of oil, natural gas, and minerals. The joint Brit. and Fr. action in respect of the Suez Canal (q.v.) against Egypt (q.v.) cannot be associated with Egypt's participation in the Algerian rebellion.

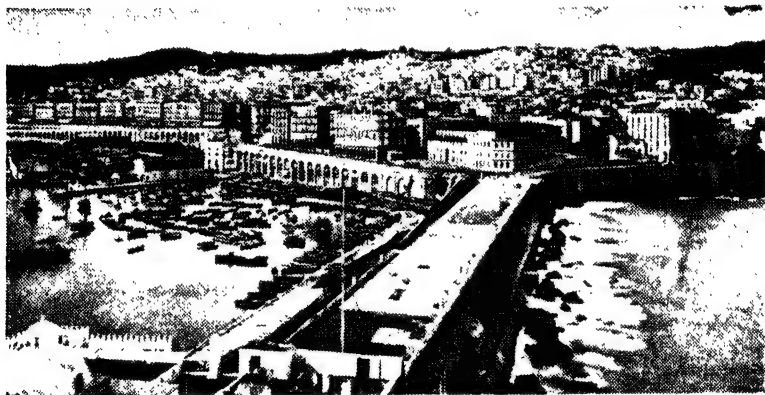
The chief tns of A., with pops., are Algiers (361,000, including suburbs), Oran (590,000), Constantine (150,000),

Bone (150,000), Sidi-bel-Abbès (150,000), Tlemcen (80,000), and Philippeville (75,000).

There are few works in English on A., but *The Algerian Problem*, pub. as a booklet by the Service de Presse et d'Information in Feb. 1957, and available at any Fr. Embassy, contains a comprehensive survey, historical, political, and economic, of A. Also various handbooks and pamphlets are available gratis from the same source. Otherwise see W. Sloane, *Greater France in Africa*, 1924, and W. B. Worsfold, *France in Tunis and Algeria*, 1930. *The Times*

Sheltered from every wind, it is a favourite winter resort. In 1954 the pop. was 361,285, comprising a medley of all nationalities, the Europeans numbering approximately 200,000.

Algoa Bay, in the SW. angle of which is situated Port Elizabeth, second city and port of Cape Prov., S. Africa. A. B. was so named by Bartholomew Diaz (q.v.). 1486. In 1820 5000 Brit. settlers landed in A. B. Port Elizabeth was named after Elizabeth, wife of Sir Rufane Donkin, acting governor of the Cape. Pop.: Whites, 83,181; Bantu, 78,953; Coloureds, 46,113; Asiatics, 4276 (1951).



E.N.A.

ALGIERS, FROM THE MARINA

index should also be consulted, especially for Mar. 1957.

Alghero, seaport in Sardinia (q.v.), on the W. coast, 17 m. SW. of Sassari (q.v.). It has a 12th-cent. cathedral. There is fishing for coral and lobsters, and a trade in wine. Pop. 21,200.

Algiers (Fr. *Alger*), cap. of Algeria. The name is derived from *Al-Jezair*, an Arabic word meaning islands. To form a harbour, which after heavy expense provides good accommodation, 4 is. were joined together. A. is situated on the slopes of a hill at the summit of which is a fortress called the Kasbah, which belonged in former days to the beys. The city consists of 2 parts, one of which is old, while the other is a marked contrast by reason of its modernity. The modern tn possesses many splendid streets, and the general air is European. The tn was founded in the 10th cent., and from 1530, when the Turkish pirate Khair-ed-Din expelled the Spaniards, until its conquest by France in 1830 it was a nest of piracy, exacting tribute from all the maritime nations. It is third in importance among Fr. seaports and a coaling station, and distributes the grain, esparto grass, wines, oil, etc., of central Algeria.

Algol, or **Beta Persei**, star of second magnitude. It is the best-known variable star, changing from magnitude 2.3 to 3.5 during a period of 68 hrs 49 min. owing to being eclipsed by a dark companion star. Vogel estimated that A.'s diameter is 1.2 that of the sun, and its dark companion about the same size as the sun, and concluded that the distance between their 2 centres is 3,200,000 m. A. has a helium spectrum, and though Al-Sufi classified it as a red star in the 10th cent., it is now a brilliant white.

Algoa, extensive dist. in the prov. of Ontario in the dominion of Canada, on the N. shore of Lake Huron. The ter. has great mineral wealth, being rich in silver and copper. The Canadian Pacific Railway passes through the dist.

Algonkian System, geological term used to denote a series of rocks of pre-Cambrian age which are younger than certain old pre-Cambrian gneisses but which are in turn followed by early Palaeozoic rocks. The term should not be used outside Canada where it was originally defined. In the region of Lake Superior these rocks, consisting of quartz, limestone, sandstone, etc., contain very valuable iron and copper deposits.

Algonkin, N. Amer. Indian tribe of the Algonquian language family. In the 17th cent. they were driven out of the St Lawrence region by the Iroquois. Today there are about 1500 in reserves in E. Ontario and W. Quebec.

Algonquian, div. of Amer. Indian languages, embracing a large number of tribes along the Atlantic coast from Quebec to Carolina, in the Upper Mississippi region, and W. into the plains of the Saskatchewan and Upper Missouri. They are polysynthetic in structure and also inflective.

Alguazil, Sp. title conferred upon judges in former times. The pure function of it has been lost, however, and any officer connected with the execution of justice now bears the name.

Alhakim I (d. 822), emir of Cordova, drove the Franks beyond the Pyrenees. *A. II*, caliph of Cordova (961-76), won many victories over the Christians, and extended the influence of Mohammedanism.

Alhama de Granada, Sp. tn in the prov. of Granada, on the Marchan. It has thermal springs, used since Rom. times. A ballad describing the fall of the tn, entitled *Ay de mí, Alhama*, was trans. by Byron. Pop. 6000.

Alhambra, tn in Los Angeles co., California, U.S.A. It stands at the entrance to the San Gabriel valley and is a residential suburb of Los Angeles. Near its tn limits are the remains of the famous San Gabriel Mission founded in 1771. Pop. 51,350.

Alhambra (*Ka't al-ahamra*, the red castle), anct royal palace and fortress in Spain, one of the most splendid examples of Moorish art in the world, standing on a hill overlooking the city of Granada (q.v.). It dates from the 11th cent., but the finer parts belong to the 13th and subsequent cents. Among its celebrated enclosures are the wonderful Court of the Lions, with its fountain, pavilions, and delicate filigree arches; the Court of the Myrtles, in which the columns are of alabaster and jasper; the Hall of the Ambassadors, with its cedarwood ceiling; the richly decorated Hall of the Two Sisters; and the whispering gallery called the Hall of Secrets. Beside the A. stands the Renaissance style Palace of Charles V, begun in 1526 but never finished. See ARCHITECTURE, Mohammedan; and see A. F. Calvert, *Granada and the Alhambra*, 1907.

Alhassan Ibn, see LEO AFRICANUS.

Alhazen, Arabian mathematician of the 11th cent. (not the Alhazen who trans. Ptolemy's *Almagest* in the 10th cent.), b. at Bassora (or Busra) and d. in Cairo in 1038. He professed to be able to construct a machine which could regulate the inundation of the Nile, but when the caliph Hakim gave him the opportunity A. saw that his scheme was impracticable and feigned madness till the caliph died. He had a reputation as an authority on optics and wrote 2 books, *Treatise on Twilight* and *Thesaurus Optice*.

Ali—son of Abu Talib—(c. 600-61), cousin and son-in-law of Mohammed

(q.v.). Pious legend has made him a great warrior and a learned man, but he took a fair share in the fighting during Mohammed's lifetime. When Mohammed d., A. was not chosen as his successor, and it was not till the third caliph was murdered that some Muslims chose him in 656. The important prov. of Syria did not recognise him and leading men in Arabia, egged on by Aisha (q.v.), whom A. had insulted, opposed him, so he retired to Iraq where he defeated his foes from Arabia. He proved an incompetent ruler, was outmanœuvred by the governor of Syria, and was murdered after a troubled 4 years, in which he could hardly be said to rule, in 661. His claim to be the heir of Mohammed was the start of a legitimist movement which gathered strength from other motives.

Ali, Hyder, see HYDER ALI.

Ali Pasha (1741-1822), Lion of Janina, b. Albania. The Turks made him pasha of Trikala, 1787, and pasha of Janina, 1788. He helped the Turks during the Austro-Russian war, and sided first with the Fr. and then with the Brit. during the Napoleonic wars. A career of cool impudence, deliberate betrayal, and high daring ended in his being put to death by Mahmud II. Though merciless and unscrupulous he did much to free Albania from bandit terrorism and treated the Christians under his jurisdiction with unusual fairness.

Alias, name given to a second writ when the previous one has been impossible to deliver or failed in effect. The term, however, has been corrupted, and applies now to false names used by criminals.

Alibi (Lat. *alibi*, elsewhere), plea of a person who, charged with a crime, alleges that he was elsewhere when the crime was committed, and thus could not be guilty.

Alicante: 1. Sp. prov., in Valencia (q.v.), with a coastline on the Mediterranean. The surface is very diversified, and the climate is temperate. Cereals, olives, fruit, and vines are grown, and silk-worms are reared. Area 2238 sq. m.; pop. 640,900.

2. (anct *Akra Leuka*; Rom. *Lucentum*) Sp. tn, cap. of the prov. of A., in a bay on the Mediterranean. It is a modern tn with fine buildings. The hill above the tn is crowned with a ruined fortress. Its port is busy, principally with ships for the Balearic and Canary Is., and it is a popular resort. Pop. 106,200.

Alicata, see LICATA.

Alice, Princess, Countess of Athlone, see ATHLONE, EARL OF.

Alice Maud Mary, Grand Duchess of Hesse (1843-78), second daughter of Queen Victoria, b. Buckingham Palace. In 1862 she married Prince Louis of Hesse, who succeeded his father as Grand Duke in 1877. During the short illness of her father the princess nursed him with the greatest care, and d. of diphtheria, caught nursing her husband and children. Her letters, ed. by Dr Sell, give a delightful impression of her as mother, daughter, and wife.

Alice Springs, tn in the Macdonnell Ranges of the N. Ter., Australia, approximately 1000 m. from Adelaide. Linked by air and rail to Adelaide, and to Darwin by air and by the 954-m.-long Stuart Highway, it is the centre of the thriving central Australian pastoral industry, and is becoming increasingly popular as a tourist centre. It is second to Darwin in size and importance in the N. Ter.; non-aboriginal pop., just over 3000.

Alliudi, see LIPARI ISLANDS.

Alien (Lat. *alienus*, foreign), one who, resident in one state, is by birth or naturalisation the subject of another. The privileges and disabilities of A.s in England have long been the subject of numerous statutes, from the reign of Edward III onwards. To-day an A. residing in Great Britain may be a property-holder, but is not enfranchised, may not hold public office, or own a Brit. ship or aircraft. The Rep. of I. was declared (Republic of Ireland Act, 1949) not to be a foreign country, and references in Acts of Parliament to A.s, foreigners, or foreign countries do not refer to it or its citizens.

Entry of Aliens into the United Kingdom. The control of the admission of A.s into the U.K. is exercised through Orders in Council made under the Aliens Restriction Acts, 1914 and 1919, as extended annually by the Expiring Laws Continuance Acts. The latest Orders in Council are the Aliens Order, 1953, and the Aliens Order, 1957; the former consolidated and revoked all previous Orders.

An A. wishing to enter the U.K. must apply for leave to land to an immigration officer at the port of his arrival. If the immigration officer decides to grant leave to land, he is empowered to attach to it conditions governing the length of the A.'s stay and his freedom to take employment, etc. An immigration officer is required to refuse an A. leave to land in certain specified circumstances, e.g. if he is not in a position to support himself and his dependants (if any) in the U.K., if he has been sentenced in a foreign country for any extradition crime within the meaning of the Extradition Acts, 1870-1935, if he is a person of unsound mind or mentally defective person, or if he proposes to enter the employment of a particular employer in the U.K., but cannot produce a written permit issued by the Ministry of Labour and National Service. The secretary of state has power to make a Deportation Order against an A. in cases where a court has recommended that one should be made, or where he deems it to be conducive to the public good that one should be made.

Generally speaking, an A. must register with the police after 3 months in the U.K. The total number of A.s registered with the police at 31 Dec. 1956 was 378,870.

Nationality and Naturalisation. An A. is defined in Section 32(1) of the British Nationality Act, 1948, as a person who is not a Brit. subject, a Brit. protected person, or a citizen of the Irish Rep.

Since the Act came into operation on

1 Jan. 1949, Brit. nationality has depended upon the possession of citizenship of the U.K. and colonies or of one of the other self-governing countries forming the Brit. Commonwealth of Nations (although there are persons who were Brit. subjects before the Act took effect, and who have retained that status without having become citizens of a particular Commonwealth country). The British Protectorates, Protected States and Protected Persons Order, 1949, sets out those persons who are Brit. protected persons by virtue of their connection with a protectorate, protected state, mandated or trust ter.

Each of the self-governing Commonwealth countries has or will enact laws setting out the persons who are its citizens. The British Nationality Act, 1948, defines those persons who are citizens of the U.K. and colonies. Subject to certain limitations, citizenship is acquired by birth in the U.K. or a colony. It can also be acquired by registration, naturalisation, or the incorporation of ter., or, subject in some cases to the fulfilment of certain conditions, by descent from a father who is a citizen at the time of the birth.

An A. of 21 years and over who fulfils the requirements of the Second Schedule to the British Nationality Act, 1948, may apply for naturalisation as a citizen of the U.K. and colonies. Among the qualifications is a total of 5 years' residence within the 8 years immediately preceding the application (12 months of this residence must have been completed in a continuous period immediately before the application). The grant of naturalisation is at the discretion of the secretary of state. A.s below the age of 21 years are not eligible for naturalisation, but the secretary of state has power to register any minor as a citizen.

A woman citizen does not lose her citizenship upon marriage to an A. An A. woman who has been married to a citizen of the U.K. and colonies does not acquire citizenship by virtue of the marriage; but, provided she has not previously renounced or been deprived of citizenship of the U.K. and colonies, she is entitled, on application, to be registered as a citizen.

United States Immigration. An aspect of the A. question which has for many years been of political importance is the attempt of countries peopled by European stocks to keep out yellow and other coloured persons. The immigration of contract labour, formerly prohibited in the U.S.A., has been permitted since 1952 under strict regulation as in Australia and Canada. Under various Acts the admission of A. immigrants into those countries, and into S. Africa, has been in fixed ratios of British to S. European persons. The present basic law of the U.S.A. is the Immigration and Nationality (McCarran-Walter) Act of 1952, which imposes various fixed ann. quotas for the admission of A.s, ranging from 100 to 65,000, from 85 different areas of the world. The quotas favour the

countries of N. Europe which were the source of the older immigration but include Asiatic countries formerly subject to exclusion. Only the consular officials of the State Dept have power to issue the essential visas. The status of A.s in the U.S.A. is determined principally by state laws, though these have to conform to international treaties. An A. does not possess political rights and is not subject to the political duties of a citizen, yet may be required to serve in the militia of the state. The laws of the states relative to ownership of real estate by A.s vary, but in most cases an A. may buy, sell, and devise real property. A friendly A. may contract, sue, and be sued in the state and Federal courts while allowed to remain in the country, but may be expelled and deported on good cause being shown, with rights of administrative and judicial appeal.

Alienation, in law, a term used to denote the voluntary transfer of estates from one person to another by conveyance and not by inheritance.

Aligarh, city in Uttar Pradesh state, India. The old part of A. consists of the town of Koli, a place of historical and strategic importance, mentioned by Ibn Bajuta in AD 1342. The fort was captured from the Mahratas in 1803 by Gen. Lake. The new city is best known for the A. Univ., now undenominational, but founded in 1875 by Sir Saiyad Ahmad Khan for Muslim students and raised in 1920 to the status of the Muslim Univ. Pop. 137,224.

Alignment, archaeological term now generally replaced by 'megalithic row' or 'avenue,' used to denote single and double lines of standing stones. Many, as on Dartmoor and in Wales, are found associated with burial cists and cairns, while others, such as the famous Callanish on the is. of Lewis in Scotland, are certainly associated with stone circles. Megalithic rows and avenues, in Britain, date from the Bronze Age. See also MEGALITHIC CULTURE.

Alima, trib. of the Lower Congo.

Aliment, **Alimentary Allowance**. In Scots law A. means the maintenance which one person may legally claim from another on account of relationship by marriage or otherwise. A. may be claimed by a parent from a child or vice versa. A husband is bound to A. his wife, and a wife who is able to do so may be required to A. her indigent husband. A wife is entitled to A. after a decree of separation, but alimony (q.v.) is not payable on divorce in Scotland: a divorced wife has no claim for A., and a wife who has divorced her husband has a claim not for A. but for her legal rights of terce and *jus relictæ* (q.v.) as if her husband were dead. This does not apply to divorce for insanity which has no effect on property rights. A wife who has custody of the children of the marriage may claim A. from her divorced husband to be expended on their maintenance and education.

Alimentary Canal, name given to the whole digestive tract from the mouth to

the anus. It includes the mouth, oesophagus, stomach, intestines with the caecum, rectum, and anus. See separate headings.

Alimentus, **Lucius Cincius** (3rd cent. BC), Rom. annalist. Very little is known of his life beyond the fact that he was praetor in Sicily in 209 BC, took part in the Second Punic War of which he wrote a valuable account, and was taken prisoner by Hannibal. Only fragments of his work survive.

Alimony, sum of money ordered by the court to be paid by either the husband or wife in a divorce case or judicial separation towards the maintenance of the other party. It must be proved that the person against whom the order is made has the means to pay. The amount may be agreed between the parties, otherwise one-fifth of the joint incomes is generally allowed. An order for permanent A. may be obtained by a wife who has obtained a final decree of judicial separation.

Alin, N. Wales, see ALLEN.

Alington, **Cyril Argentine** (1872-1956), Eng. cleric and schoolmaster, headmaster of Shrewsbury, 1908, Eton, 1916, Dean of Durham, 1933. He wrote a number of books on Eton, including 3 collections of *Eton Fables*, 1921, 1927, and 1933; readers' guides to the O.T. and N.T., and sev. detective novels.

Aliphatic Compounds form one of the great divs. of organic compounds. They are so called on account of the fact that the fats are among the most typical members of this div. (Gk *aleiphar*, fat). A. C. are characterised by the open-chain skeleton of carbon atoms in their molecules, as contrasted with the closed-ring skeleton found in aromatic and heterocyclic compounds. All A. C. may be regarded as ultimately derived from methane or marsh-gas, CH₄, by processes of replacement. Among the prin. members of the group are the *paraffins* (including methane, ethane, pentane, petrol, paraffin oil, lubricating oil, vaseline, and paraffin wax), the *olefines* (e.g. ethylene, C₂H₄), *acetylene* (C₂H₂), the *alcohols* (q.v.), *ether*, *chloroform*, *acetic* and other acids, *esters* (e.g. ethyl acetate or acetic ether), certain classes of *amines* (q.v.), the *carbohydrates*, such as starch, sugar, and cellulose, and of course the *fats* themselves. In general properties A. C. are distinguished from aromatic compounds in numerous ways, particularly in their behaviour with nitric acid and sulphuric acid.

Alicans, medieval cemetery near Arles that gave the name to a *chanson de geste* of the Carolingian epic cycle (middle of 12th cent.). The most important episodes are the 2 battles at Alyscamps (Elysii Campi) near Arles. In the first battle Wm 'Court Nez' is beaten by the Saracens, but in the second he takes his revenge.

Alishan, **Leon** (1820-1901), Armenian poet and historian, b. Constantinople. He occupied a chair in the Raphael College at Venice, where he was a member of the Mekhitarian Congregation on the is. of St Lazarus, an Armenian cultural

centre. His works include *Popular Songs of the Armenians*, historical monographs, and trans. of Eng., Ger., and Fr. poetry. His knowledge of hist. was extensive, and he wrote a *History and Geography of Armenia*.

Alison, Archibald (1757-1839), philosopher, b. Edinburgh. Educ. at Glasgow Univ. and Oxford. He was ordained in 1874 and became an Episcopal minister in Edinburgh. His once famous *Essay on the Nature and Principles of Taste*, 1790, embodied the theory that objects appear beautiful because of the associations they conjure up.

Alison, Sir Archibald (1792-1867), younger son of the Rev. Archibald A., b. Shropshire, studied at Edinburgh Univ. He was called to the Scottish Bar in 1814, made an advocate-deputy for Scotland in 1822, and became prominent as an authority on politics and law. Pub. *The Principles of Criminal Law of Scotland*, 1832-3. Created baronet in 1832.

Aliwal North, tn and dist. of S. Africa, on the Orange R., a trading and agric. centre for the N.E. part of Cape Prov. and the adjacent regions of Basutoland and Orange Free State. Hot sulphur springs similar to those at Aix-la-Chapelle (Aachen) lie 2 m. from the tn, where well-equipped baths have been built. Pop.: Whites, 2767; Bantu, 5384; Coloureds, 1544.

Aliwal South, see MOSSEL BAY.

Alizarin ($C_{14}H_8O_2(OH)_2$), or 1:2-dihydroxyanthraquinone, a derivative from anthraquinone, known to the ancients as extracted from madder-root, and used by them for dyeing. It is now prepared synthetically from anthracene. A. crystallises in dark red prisms and sublimes in orange-coloured needles, melting at 290° C. It is almost insoluble in water, but dissolves in alcohol. It yields with metallic oxides magnificently coloured insoluble compounds called 'lakes,' to which it owes its great value for dyeing purposes. Ferric oxide with A. gives a violet-black compound, chromium oxide a claret, calcium oxide a blue, and aluminium and tin give different shades of red. See DYE.

Aljubarrota, vil. of Portugal, in Leiria dist., 14 m. SSW. of Leiria (q.v.). In 1385 John I (q.v.) of Portugal, supported by the Eng., defeated John I of Castile here, and secured his country's independence. Pop. 700.

Alk. resin obtained from the turpentine tree (*Pistacia terebinthus*), which grows chiefly in the region of the Mediterranean. A yellow to green liquid Chian or Chio turpentine is distilled from it, leaving colophony (q.v.) as residue.

Alkahest, see ALCANEST.

Alkali, name applied to a group of metals comprising lithium, sodium, potassium, rubidium, and caesium. These metals form hydroxides which are soapy to the touch and are easily distinguished from acids and neutral bodies by their action on litmus, turmeric, methyl-orange, and other indicators. The term is sometimes applied to the hydroxides only, but in the important A. manuf. it

includes the carbonates, and is particularly associated with carbonate of soda.

The hydroxide and carbonate of the radical ammonium (NH_4) are included among the A.s.

The word A. is derived from the Arabic *al-qali*, ashes, from the fact that soda and potash were derived from the ashes of plants; in fact, for cents, this was the only known method of manufacturing soda. In 1793 the Fr. Gov. were faced with the necessity of finding some method of soda manuf., as, owing to the effect of the revolution on commerce, France was cut off from the chief sources of the world's supply. In response to the gov.'s appeal, Nicolas Leblanc elaborated a process which has now become obsolete (having been replaced by the ammonia-soda process, for which see below), but was very largely employed for over a cent. It consisted in heating salt with sulphuric acid, and subjecting the sodium sulphate so obtained, mixed with coal and limestone, to a high temp. in a reverberatory furnace. The sodium carbonate was then dissolved out of the residual mass, and the solution evaporated, when crystals of washing-soda or sodium carbonate decahydrate, $Na_2CO_3 \cdot 10H_2O$, were obtained. The Leblanc process would have been given up long before it actually expired but for the fact that 2 important by-products, viz. hydrochloric acid and sulphur, were obtained from it.

Ammonia-Soda Process. In this process brine is saturated with ammonia and filtered. The filtrate is then treated with carbon dioxide in a carbonating tower, consisting of a series of cylindrical compartments through which the brine slowly percolates. The carbon dioxide is blown in at the bottom of the tower, so that the following reaction takes place: $NH_3 + NaCl + H_2O + CO_2 = NaHCO_3 + NH_4Cl$.

The liquid sludge that flows out at the bottom of the tower is filtered in vacuum filters, and the residue of sodium bicarbonate left in the filters is then heated, when it splits up into sodium carbonate, steam and carbon dioxide: $2NaHCO_3 = Na_2CO_3 + H_2O + CO_2$.

The main advantages of the ammonia-soda process (sometimes known as the Solvay process, after its inventor, a Belgian chemist) are (i) it yields a very pure product, (ii) it requires much less labour, (iii) there are no noxious by-products.

Caustic soda, or sodium hydroxide ($NaOH$), is obtained by heating sodium carbonate solution with slaked lime: $Na_2CO_3 + Ca(OH)_2 = CaCO_3 \downarrow + 2NaOH$, and by the electrolysis of brine; chlorine is given off during the electrolysis, and this also is a valuable chemical product. Sodium and potassium hydroxides are white, deliquescent, crystalline solids easily soluble in water. Like all A.s. they neutralise acids to form salts.

In medicine the term A. is restricted to the hydroxides, which are used as caustics and for the neutralisation of acids. Ammonia is particularly valuable

for counteracting the poison in the stings of insects, immediate application generally having the result of neutralising the acid. A poisoning is treated by giving the patient dilute acid, such as vinegar. As an antidote to acid poisoning, the carbonates should be used; powdered chalk or, in an emergency, whiting scraped from the wall or ceiling is suitable.



Netherlands National
Tourist Office

CHEESE MARKET, ALKMAAR

Alkali Lands are regions where the soil contains quantities of alkali salts, e.g. in Nebraska, Montana, and New Mexico. Such soil requires very little moisture, and to prevent damage to the estates caused by abundant rainfall the lands are carefully drained and treated with gypsum.

Alkaline Earths, a name given to the group of metals comprising *magnesium, beryllium, calcium, strontium, barium, and radium*. Formerly the known oxides of these metals were considered to be elementary substances, and were known as earths. The oxides possess an alkaline reaction and neutralise acids.

Alkaloids, organic substances of complex composition and basic character found in plants of certain families. The A. were so named because they are like alkalis in some respects, particularly as regards basic properties. They are generally colourless crystalline compounds with a bitter taste, but a few are liquids. Usually they are insoluble in water but are soluble in organic solvents. Some of them are excessively poisonous, the general antidote being strong tea. They

are obtained by cutting up the plants and macerating the mass with acidified water in a conical vat, where a layer of lint receives the percolated liquid. If a volatile alkaloid, it is separated with steam after making the mixture alkaline; if an insoluble alkaloid, it may be obtained by filtration, after which it may be purified by crystallisation. The more important A. are atropine, cocaine, colchicine (which is found in colchicum), conine, morphine, narcotine, nicotine, and strychnine. Reference to these can be found under the appropriate headings.

Alkan, real name **Charles Henri Valentin Morhange** (1813-88), Fr. pianist and composer, b. Paris. He is best known for his numerous pianoforte studies, which are extremely difficult and which added materially to the technical resources of piano composition.

Alkanet, see PENTAGLOSSIS.

Alkmaar, anct mkt tn in the prov. of N. Holland, Netherlands, 20 m. NNW. of Amsterdam. It is situated on the N. Holland Canal, and is itself intersected by a network of canals. The tn is famous for its cheese market, held every Friday morning from May until Oct. The St Lawrence Church, a large Gothic building constructed between 1470 and 1512, has one of the oldest baroque organs in Europe. The Gothic tn hall (Stadhuis), built in the early 16th cent., contains the municipal museum. Pop. (1954) 41,090.

Alkora, see KORAN.

Alkyl, chemical term denoting radicals of the formula C_nH_{2n+1} ; the chief members are *methyl* (CH_3), *ethyl* (C_2H_5), *propyl* (C_3H_7), and *amyl* (C_5H_{11}). These radicals are not stable in the free state (see RADICAL) but are the radicals of a large number of types of organic compounds such as alcohols, esters, aldehydes, ketones, and halides.

Alkyl Oxides, see ETHERS.

All Fools' Day, 1 April. The custom of sending one upon a pointless errand is supposed to have been a burlesque of the sending hither and thither of Christ from Annas to Caiaphas, and from Pilate to Herod.

All Hallows, **All Hallowmas**, or simply **Hallowmas**, the O.E. name for All Saints' Day, 1 Nov. See ALL SAINTS' DAY.

All Hallows Barking, church near Tower Hill, London, sometimes called A. H. by the Tower, and in former times A. H. Barkingchurch. There is no record of its foundation, which took place in Saxon times, possibly as early as the 7th cent. Its affix of Barking suggests an original or early connection with Barking Abbey, Essex, which later owned it over various periods for some 250 years. A Norman church which replaced the original structure was rebuilt in the 13th cent. A mortuary crypt discovered in 1926 dates probably from the mid 14th cent. There were later additions, including a 17th-cent. tower from which Pepys watched the Fire of London. Except for the tower and crypt the church was destroyed in an air-raid in 1941, but it has been restored.

The church is noted for its brasses, the earliest dating from 1389. Wm Penn was baptised and J. Q. Adams, 7th president of the United States, was married here. It is the guild church of the Toc H movement (q.v.).

All Saints' Bay, on which stands São Salvador or Bala, is situated on the E. or Atlantic coast of Brazil. It is 25 m. long and 20 m. wide, and is supposed to be large enough to afford anchorage for the navies of the whole world.

All Saints' Day (1 Nov.), called in O.E. All Hallows, All Hallowmas, or simply Hallowmas, is a feast in honour of all the saints, i.e. of the whole Church triumphant, instituted in 835. The evening preceding All Hallows is called Hallowe'en, and on this night ceremonies of Druidical origin—bonfires, bell-rings, and domestic merrymakings, in which lamb's-wool (ale or wine mixed with the pulp of roasted apples) was the prin. beverage—were once held. In England, Scotland, and Ireland fireside ceremonies were held, and the future was supposed to be made known. An account of these ceremonies is given in the poem of Burns entitled *Hallowe'en*.

All Saints' Islands, see WEST INDIES.

All Souls College, Oxford, founded in 1438 by Archbishop Henry Chichele with Henry VI as co-founder. It forms a memorial to those who fell in the Fr. wars of their time. Alone of the older colleges it has no undergraduates, its members being all fellows, and always including some of the greatest authorities in law, hist., and the social sciences. Its library, the Codrington, is the most important in Oxford after the Bodleian.

All Souls' Day, Rom. Catholic festival held on 2 Nov., which was first instituted by Odilo in the monastery of Cluny, 998, the observance soon becoming general in all Rom. Catholic countries. On this day prayers and offerings are made for the dead. The festival is recognised also by the Anglican Church.

All the Talents, ministry organised by Grenville in 1806, on the death of Wm Pitt, and so named in derision by the opposition party.

'All the Year Round', see DICKENS, CHARLES.

Alla Breve, It. musical term which, placed at the beginning of a movement or indicated by the sign C , signifies that although there are four crotchets to the bar, the time is halved to a speed fast enough to be counted at two beats to the bar.

Allah (Arabic), name used by Muslims to denote the Supreme Being. Apparently it is a contraction of *al-ilah*, the god. The same root occurs in Hebrew, Aramaic, and old S. Arabian, but not this contraction.

Allahabad, one of the largest cities in Uttar Pradesh state, India. It is situated on the l. b. of the R. Jumna, close to its junction with the R. Ganges. There was an auct city on this site, Prayag or Prag, most sacred to Hindus, and the holy Akshat Bat, or undying banyan tree, is a great resort for pilgrims.

Here also is the famous Asoka Pillar on which are inscribed the edicts of Asoka, issued in 242 bc. The present fort and city were founded by Akbar in AD 1583. A. is the seat of a high court (1866) and a premier univ. (1887). The first Indian National Congress was held here in 1885. There is a Mela, or fair, of great antiquity held every year at the confluence of the Jumna and Ganges which attracts vast numbers of pilgrims. Pop. 333,362.

Allamanda, genus of tropical evergreen climbers, family Apocynaceae. *A. cathartica*, a climbing plant with yellow flowers, from the W. Indies, has emetic and purgative properties, and is used as a cathartic.

Allan, David (1744-96), Scottish historical painter, b. Alloa. He studied at Glasgow in Foulis's Academy, and later at Rome. He secured the gold medal of St Luke for his 'Origin of Painting,' Pictures such as his 'Highland Dance' and 'Scotch Wedding' caused him to be nicknamed 'the Scottish Hogarth.' He d. at Edinburgh.

Allan, Sir Hugh (1810-82), founder of the A. Steamship Line (q.v.), b. Saltcoats, Ayrshire. He emigrated to Canada, and was one of the promoters of the Canadian Pacific Railway. He was knighted in 1871, and d. at Edinburgh.

Allan, Sir William (1782-1850), painter of historical scenes and studies of Russian life, b. Edinburgh and educ. at High School there. He studied art at the Trustees' Academy with Wilkie, and at Royal Academy schools. Among his famous paintings are 'Peter the Great teaching his Subjects Shipbuilding' and 'Knox admonishing Mary Queen of Scots.' In 1805 he went to Russia, but returned to Edinburgh, 1814, and later travelled widely. He was made R.A. in 1835, P.R.S.A., 1838, knighted, 1842.

Allan Line, steamship company founded in 1853 by Sir Hugh Allan (q.v.). The line was amalgamated with the Canadian Pacific Steamship Co. in 1916.

Allantoin ($\text{C}_4\text{H}_8\text{O}_2\text{N}_2$), organic substance found in the allantoin fluids of many animals and in many plants. It is also formed in the oxidation of uric acid.

Allantois, foetal membrane derived from the mesoblastic and hypoblastic layers, characteristically developed in birds, reptiles, and mammals. In birds and reptiles it is developed from the lower end of the digestive tube, and has first the form of a small ovoid sac, but increases rapidly in size and makes its way into a space between the amnion and the serous membrane. It finally encloses the whole embryo and yolk-sac together with the remains of the albumin, which by this time has been largely absorbed. The A. serves as a respiratory organ, exchange of gases readily taking place through the porous shell; its cavity serves as a urinary bladder, excrement being discharged into it from the kidneys. In many mammals a connection is often estab. between the A. and the uterine wall, by which nourishment is conveyed to the embryo. At birth this

connection becomes part of the umbilical cord and is cast off, whilst the part that remains within the body develops into the urinary bladder.

Aillard, Jean François (1785-1839). Fr. general who first served under Napoleon. In 1815 he left France and went to Lahore in 1820, where he entered the service of Ranjit Singh. He organised the army according to the Fr. model, and was made generalissimo of the forces.

Allatius, Leo (1586-1669), Gk scholar and theologian, b. in the is. of Chios. He settled at Rome, where he taught his native language at the Gk College, and devoted his spare time to studying the anc. classics and theology. Entrusted by Gregory XV with the removal of the *Bibliothec. Palatina* from Heidelberg to Rome, he was afterwards (1661) appointed Vatican librarian, and held that post until his death. Besides editing MSS. and translating Gk authors, A. wrote a number of original works, including the treatise *De Ecclesiæ Occidentalis et Orientalis perpetua Consensione*.

Allbutt, Sir Thomas Clifford (1836-1925), physician, b. Dewsbury, Yorks, and educ. York, Cambridge, St George's Hospital, and Paris. He graduated in 1860 and settled in Leeds as a consultant. In 1866 he invented the short clinical thermometer. He moved to London in 1899, but 3 years later was appointed regius prof. of physic at Cambridge Univ., where he soon exerted an influence on medicine reaching far beyond the bounds of the univ. He ed. the famous *System of Medicine* (8 vols.), 1886-9 (2nd ed., 11 vols., 1906-11). He was elected physician to Addenbrooke's Hospital in 1900, and at the age of 80 was president of the British Medical Association (1916-21). He was K.C.B. in 1907 and a privy counsellor in 1920. A. was a man of great erudition, scholarly in his tastes, courtly and aristocratic in his manner, and a master of Eng. prose. It is considered that the character of Dr Lydgate in George Eliot's *Middlemarch* was drawn from him. A. made valuable contributions to medicine and was well versed in its hist.; his writings include *Disease of Arteries*, including *Angina Pectoris*, 1915, *Science and Medical Thought*, 1901, and *Greek Medicine in Rome*, 1921. See biography by Sir H. D. Rolleston, 1929.

Allegheny Mountains, see APPALACHIAN MOUNTAINS.

Allegheny River, Pennsylvania and New York, U.S.A., 325 m. long, joins Monongahela R. at Pittsburgh to form Ohio R.

Allegiance was defined by Coke as 'the highest and greatest obligation of duty and obedience' of a subject, and a violation of A. constitutes the highest legal offence, namely treason (q.v.). Every natural-born subject, every naturalised citizen, and every alien while within the kingdom owes this duty to the king, his liege lord. Most public officials and many professional men are required to take the *Oath of A.* when entering on their career. The claim of the popes of Rome to temporal power, particularly in the matter of releasing Catholics from A. to

heretical sovereigns, was for about 2 centuries the cause of great difficulty in this country. The Oath of A., drafted in the reign of James I, required Catholics to reject this claim, and was considered by them to be unnecessarily offensive to their faith, but after long controversy and not a little persecution the objectionable clauses were removed in 1778.

Allegory, Gk word signifying the description of one thing under the image of another, derived from *allos*, other, and *agoreuein*, to harangue. In literature, a figurative discourse in which the writer or speaker conveys to the mind a parallel idea by its resemblance in its properties and circumstances to the subject of his ostensible discourse. In this respect it resembles metaphor, and A. has often been described as 'extended metaphor.' This is the most usual signification of the word, but it is also used for other forms of art, and may be applied to painting, sculpture, or the histrionic art. In painting, one may mention the famous picture of Proudhon, 'Justice and Vengeance pursuing Crime,' and the many allegorical pictures of the great Eng. painter, G. F. Watts. The well-known picture of Holman Hunt, 'The Light of the World,' hung in St Paul's Cathedral, is a good example of pictorial A. Reynolds-Stephens's group, representing Queen Elizabeth and Philip of Spain playing on a chess-board with ships as pieces, depicts in sculptural A. the struggle for sea supremacy between 2 nations. Returning to literature, in all branches of which one finds the use of A., it is important to realise the difference between A. and the fable. The fable has for its object the conveying of some moral precept or enforces some lesson for daily life, but an A. is by no means so limited in its scope. A further differentiation may be made that while, on the one hand, the merit of a fable lies in, and its lesson is emphasised by, its improbability, as, for example, Aesop's fable of the *File and the Piper*, where inarticulate objects speak, on the other hand, the A. depends for its excellence on its fidelity and its detailed correspondence to actual existence. A. has always been used for the personification of abstract ideas, and for its value in this direction has been much employed to assist the mind in grasping abstract principles. This teaching of the abstract by the concrete was often employed by Christ and other biblical characters in the form of a parable, or short A., to bring home to their auditors in a more facile manner religious truths. But this personification of the abstract is not the whole function of A., and it has been employed to represent persons and countries. Thus, Edmund Spenser, in his *Faerie Queene*, depicts the Earl of Leicester, Sir Philip Sidney, and other Elizabethans, including the queen herself. Sir Thomas More, in his *Utopia*, sets forth by an A. about an imaginary country his opinion as to how a country should be governed, and Dean Swift, 2 cents. later, in his well-known A.s, *The Battle of the Books* and *A Tale of a Tub*, satirises the shams and

folies of his time. It is a fact not to be lost sight of that the indirect attack of abuses by means of the A. was often the only method open to the would-be reformer. The use of A. dates from the earliest ages, and was especially popular among the peoples of the E. It follows from the utility of A. for conveying more easily abstract ideas to the mind that philosophers should use it in the instruction of their pupils. Among those to employ this method of instruction one of the earliest was Plato, and nowhere does he employ it more effectively than in his famous A. of the 'Cave,' which is to be found in his *Republic*. By means of an allegorical story of men in a cave believing that their shadows, thrown by a fire behind them on to the wall, are realities, he seeks to show the difference—a commonplace in all philosophical discourse—between the permanent 'idea' and the ever-changing phenomenal world of 'appearance.' The term to allegorise, i.e. to interpret the literal significance of a narrative, giving it an esoteric or more spiritual meaning, is the converse of the above. Among those to apply this method to the Scriptures were Philo the Jew of Alexandria, who in the time of Christ so interpreted the O.T., and his method was followed by the early Christian sect of the same city, notably by Origen (AD 185-254). The latter had the hardihood to explain, what is of course universally conceded to-day, that the story of the Garden of Eden and the Fall was an A. The neo-Platonists similarly sought to arrest the decay of Gk mythology at about the same time and by the same methods. A. passed into the Middle Ages, and took its place in the 'miracle' plays of the time, and in the 'moralities' of the 15th and 16th cents. Among the best known of these 'moralities' is that called *Everyman*, an A. in which all men are personified in Everyman, who is called upon by God to give an account of his life. As was to be expected, the A. has played a large part in the development of poetry, and it was employed to such good purpose by Geoffrey Chaucer, the father of Eng. poetry, that he influenced for nearly 200 years the poets who followed him. Chaucer's contemporary, Langland, produced in 1362 a remarkable A., *The Vision of Piers Plowman*, in which he satirised the customs of his time. With Edmund Spenser's *Faerie Queene* (1590) A. again rises to great heights in poetry, but perhaps the best known of all A.s in the Eng. tongue is the *Pilgrim's Progress* of John Bunyan (1678). This story of the journey of Christian from 'this world to the next,' and the story of the siege of 'Mansoul,' told in his book *The Holy War*, are written in the purest English. Another well-written A. is Addison's *Vision of Mirza*, which appeared in the *Spectator*. Of modern A.s one may mention Olive Schreiner's *Dreams*, Jack London's *White Fang*, and Anatole France's *Ile des pingouins* in prose; and Maeterlinck's *Blue Bird* and Edmund Rostand's *Chantecler* in drama. See C. S. Lewis, *The Allegory of Love* (3rd ed.), 1948.

Allegretto (It. dimin. of *allegro*), musical term—a movement or time not so quick as *allegro*, but quicker than *andante*.

Allegri, Antonio, see CORREGGIO.

Allegri, Gregorio (1582-1652), musical composer, b. Rome. He will always be remembered as being the composer of the famous *Miserere* written for 9 voices, and still sung in Holy Week in the Sistine Chapel.

Allegro (Lat. *alacer*, joyful, brisk), musical term originally denoting a brisk, sprightly movement, but now signifying simply an animated pace.

Alleluia, see HALLELUJAH.

Allemande, Fr. musical term (O.E. equivalents were *almand* and *almain*) designating a dance, generally in a moderately paced 4-4 time. With the courante, sarabande, and gigue it is one of the obligatory movements in the old suite form.

Allen, Charles Grant Blairfindie (1848-1899), Brit. author, b. Kingston, Ontario. Educ. King Edward's School, Birmingham, and Oxford, he was a schoolmaster in Jamaica 1873-7, but later settled in England and devoted himself to writing scientific works and novels. The former include *Physiological Aesthetics*, 1877, *The Evolutionist at Large*, 1881, and *The Evolution of the Idea of God*, 1897; best known of the latter are *The Devil's Die*, 1888, *The Great Taboo*, 1890, and *The Woman Who Did*, 1895, an unconventional book which provoked much discussion.

Allen, Henry T. (1859-1930), Amer. soldier, b. Sharpsburg, Kentucky, U.S.A.; graduated U.S. Military Academy 1882; served with the Mexican punitive expedition in 1916. He went to France as commander of the 90th Div. of the Amer. Expeditionary Force in 1917, and was Commander-in-Chief of the Amer. army of occupation in the Rhineland, July 1919. He wrote *Cavalry Notes*, 1911, *My Rhineland Journal*, 1924, and *The Rhineland Occupation*, 1927.

Allen, Horatio (1802-89), Amer. civil engineer, b. Schenectady, New York. He made the first railway trip in America, operating the Stourbridge Lion in 1829 at Honesdale, Pennsylvania. He was chief engineer of the S. Carolina railway and later the Erie railway, of which he was also president. He was consulting engineer to the Panama railway and president of the Amer. Society of Civil Engineers.

Allen, Sir Hugh Percy (1869-1946), Brit. prof. of music, b. Reading; he began his musical career at Chichester Cathedral as assistant organist. In 1897-8 he was organist at St Asaph Cathedral. He was conductor of the Bach Choir, London, 1901-20; prof. of music, Oxford Univ., from 1918; and director of the Royal College of Music, London, until 1937. As prof. of music at Oxford A. did valuable work in widening the scope and practicality of the courses there; while as a choral conductor he was always highly successful.

Allen, Ira (1751-1814), politician of Vermont; b. Cornwall, Connecticut; removed to Vermont, 1772, where he served

as lieutenant under his brother Ethan, who captured the fort of Ticonderoga from the Eng. in 1775. As a member of the legislature he was zealous in asserting the independence of Vermont. He took an active part in the negotiation re the 'New Hampshire Grants.' In 1795 he visited Europe to buy arms, and was arrested at Ostend and brought to England, where he was charged with supplying arms to the Irish rebels. He was acquitted after litigation lasting 8 years.

Allen, Ralph (1894-1764), the Man of Bath, Eng. philanthropist and postal reformer. He was acquainted with Pope and Fielding and he appears as Squire Allworthy in *Tom Jones*. His benevolence became proverbial.

Allen, William (1532-94), cardinal, b. Rossall, and educ. at Oriel College, Oxford. He became principal of St Mary's Hall in 1556, but left England in 1561 since his Catholicism conflicted with Elizabeth's eccles. policy. He lived in hiding in England, 1562-5, and then returned to the Continent, where he was ordained priest. A. founded the Catholic seminary at Douai in 1568 (later transferred to Rheims) and arranged for the foundation of an Eng. Jesuit college in Rome (1579). The trans. of the Douai Bible was begun by A.

A. lived in Rome from 1585, and from this time onwards his efforts for the re-conversion of England to Catholicism became more political in character. In 1587 he was created a cardinal. Had the Armada (q.v.) succeeded in conquering England, A. was to have been made Archbishop of Canterbury. See life by Martin Hailie, 1914.

Allen, William Hervey (1889-1949), Amer. novelist, b. Pittsburgh. Educ. Pittsburgh Univ., he served as lieutenant in the army in the First World War and afterwards taught for a time at Vassar. During a five years' stay in Bermuda he wrote *Anthony Adverse*, 1933, which was a great success and set the fashion for mammoth novels of sev. hundred thousand words. Later novels were *Action at Aquila*, 1938, *The Front and the Fort*, 1943; *Bedford Village*, 1945, and *The City in the Dawn*, 1947. He also wrote a life of Poe and sev. vols. of poetry.

Allen, Alin, or Alyn, trib. of the Dee, N. Wales. It rises in Denbighshire and flows through Flintshire into the Dee.

Allen, Bog of, covers much of the central plain of Ireland, stretching from Kildare westwards through Offaly to the Shannon. It is the chief source of Ireland's peat fuel production.

Allen, Lough, see LEITRIM and SHANNON.

Allenby, Field Marshal Sir Edmund Henry Hynman, Viscount of Megiddo and of Felixstowe (1861-1936), Brit. soldier, educ. Haileybury and Sandhurst. Entered the army, 1882, in the Inniskilling Dragoons. Gained distinction as a column commander in the S. African War 1899-1902. Became inspector-general of cavalry, which post he held till 1914. In the First World War he won a brilliant reputation first as a cavalry leader, then as an army commander in France, and

finally as the Commander-in-Chief of the Egyptian Expeditionary Force. In France in 1914 he was conspicuous at Mons and in the Great Retreat, leading a cavalry div. with consummate skill, putting up a notable resistance at Holbeke in the Ypres battle of Oct. 1914. He was then promoted successively to corps commander and army commander (3rd Army), and rendered valuable services at the battle of Arras (1917). In Egypt he took over the chief command from Sir Archibald Murray, who had, with painstaking preparation, succeeded in advancing as far as the N. edge of the Sinai Desert. The task which confronted A. was the capture of Gaza, a naturally strong position and artificially reinforced by cunning field-engineering work. To the accomplishment of this task he brought administrative ability of a high order, and a patient study of the vast problems of supply and transport, the difficulty of which was enhanced by desert conditions. His strategy and tactics were masterly. Beersheba was captured and within 6 weeks of the commencement of his advance Jerusalem surrendered to the Brit. Army. Many of his troops were then transferred to France to repair losses, and he had perforce to spend much time in reorganising his army with less trained men, among whom were Indian troops. But again his organising capacity proved equal to his next task, which was the final overthrow of the whole Turkish Army, which he effected by executing one of the greatest campaigns of movement in the hist. of warfare, his army sweeping resistlessly forward beyond the Jordan valley to Damascus and Aleppo, after a crushing victory in the battles of Megiddo (18 Sept. to 31 Oct.), 1918. For these services he was given a viscounty and Parliament voted him a grant of £50,000. In 1919 he was appointed to the post of high commissioner in Egypt, where the rise of the Nationalist party and the aspirations of Egypt to sovereign independence demanded the utmost tact, as well as great administrative capacity, to the end that a settlement might be effected which should safeguard Brit. interests without forfeiting the confidence of the Egyptian people. He returned to England in 1922, in which year Egypt was declared an independent kingdom. Named after him was A. Bridge (built in 1927) which crosses the Jordan, 1200 ft below sea level, on the road between Jerusalem and Amman (name subsequently changed, 1957). See also EGYPT. See Earl Wavell: *Allenby: Soldier and Statesman—A Study in Greatness*, 1940; *Allenby in Egypt*, 1943.

Allende, see SAN MIGUEL DE ALLENDE.

Altenstein, see OLSZTYN.

Allentown, co. tn of Lehigh co., Pennsylvania, on the Lehigh R. It is an important manufacturing centre, producing steel products, automobiles, cement, machinery, electrical appliances, textiles, and clothing. The tn was settled first in 1752, and owes its name to John Allen, son of the chief justice of the prov. It is the

seat of Muhlenberg College and Cedar Crest College. Pop. 106,756.

Allergy, exaggerated reaction by the body to various foreign substances or physical agents that are harmless in similar amounts to normal people. One who is affected by A. is said to be allergic. The reaction is referred to as an allergic reaction. A substance which causes an allergic reaction is called an allergen. The reaction is of similar type in the same individual for each substance, and it is quite different from any toxic action the substance might have in a large dose. As a rule only a minute dose of allergen is necessary to produce a reaction in people who are allergic to it. The type of allergic reaction is usually constant in any person. Thus the reaction of one may be in the form of spasm of the bronchial tubes (see **ASTHMA**); that of another may be in the form of nettle rash or urticaria (q.v.); and yet another may be in the form of hay-fever (q.v.). Certain types of allergen tend to cause certain types of reaction. Thus foods usually cause urticaria or eczema (q.v.); pollens, hay-fever; dusts and animal danders, asthma. The exact nature of the allergic reaction is not completely known, but the so-called histamine theory fits most of the evidence and undoubtedly explains the greater part of the mechanism of A. According to this theory a chemical substance, histamine, is liberated from the cells of the particular tissue in which the reaction occurs. We have seen elsewhere how in the reaction of immunity (see **BACTERIA, Immunity**) antibodies, known as antigens, are formed in the blood stream to neutralise invading foreign proteins, by uniting with them. The same thing happens with allergens; antibodies are formed against them. But the allergen-antibody union takes place in or on the tissue cells and not in the blood stream as it does in the other forms of immune reaction. In the course of the allergen-antibody union histamine is liberated, and it is this histamine, it is believed, which causes the actual manifestations of the allergic reaction. The liberation of histamine has 2 important physiological actions: first, it causes the small blood vessels to leak so that fluid is poured out into the tissues; secondly, it causes spasm of smooth muscle. Observation of the symptoms of urticaria, hay-fever, and asthma show that these actions do indeed take place. Furthermore certain drugs of a group known as anti-histamine drugs—because they are antagonists to histamine—are effective in relieving many allergic symptoms. They are not so effective in asthma, however, but this may be because in this form of reaction the histamine is produced from outside the tissue cells.

Nobody knows why some people should suffer from A. and not others. Heredity is a predisposing cause: 50 to 70 per cent of allergic patients have an allergic family history. Predisposing causes in asthma are whooping cough, pneumonia, or other severe respiratory diseases. The precipitating cause of an allergic reaction may be extrinsic or intrinsic, but it is usually both.

The extrinsic factors, or specific allergens, may be inhalants (dust, feathers, grass pollens), ingestants (egg, cheese, milk, fish), injectants (serums and other foreign proteins), and contactants (primula leaves, geranium leaves, tomato leaves, rubber, cosmetic powders, etc.). The intrinsic, non-specific factors may be psychological, climatic, physical, chemical, and mechanical.

The treatment of A. depends, first, upon prevention by the avoidance, so far as is practical, of contact with the allergens which cause a reaction. Desensitisation may be possible by means of a course of injections of minute doses of the specific allergen, the size of the dose being gradually increased until the patient becomes immune. This form of treatment is more successful in hay-fever than in other types of A., but it needs a very long course of injections. The antihistamine drugs are valuable in treating reactions and bring relief to most cases of urticaria, eczema, and hay-fever. Asthma is the most resistant to treatment of all the A.s, partly because intrinsic psychological factors often play a large part in its causation. Injections of adrenaline (q.v.) relieve the spasm of severe attacks, but it is not curative. It was in 1906 that von Pirquet coined the word A. to indicate 'an altered capacity to react.' Clinicians took it up enthusiastically and for a time the diagnosis of A. was given to nearly every disease for which there was no specific cause known. The pendulum then swung the other way, but to-day, 50 years later, the proper place of A. in the aetiology of disease is becoming more precisely defined.

Allerion, or **Alerion**, heraldic device, consisting of an eagle with outspread wings, but without beak or feet, as in the arms of Montmorency.

Allestree, or **Allestrey**, Richard (1619-1681), divine, b. Uppington, Shropshire. Educ. at Christ Church, Oxford. A. served in the Royalist army; when the parl. forces sacked the Oxford colleges, A. at great risk saved many Christ Church treasures. He was expelled from the univ. for refusing to submit to the authority of Parliament. At the Restoration he was made canon of Christ Church, and regius prof. of divinity in 1663.

Alleyn, Edward (1566-1626), actor, and founder of Dulwich College (q.v.), b. near Bishopsgate, London. Married Henslowe's stepdaughter in 1582. In 1600 built, with Henslowe, the Fortune Theatre, London. In 1604 became master of the royal games of bears, bulls, and mastiffs. Retired from the stage, 1604.

Alliaceus Plants are those which belong to the *Allium* genus, and include chives, garlic, leeks, onion, romances, ransomes, and shallots. The inflorescence is umbellate, and the various species have tunicated bulbs, or swollen underground buds, which are cultivated for culinary purposes.

Alliance, city in Ohio, U.S.A., on Mahoning R., 20 m. NE. of Canton. It is a coal-mining, industrial, and distribution centre. Mt Union College is here. Pop. 26,200.

Alliance, union between nations or govts.

formed by treaty, league, or agreement. A definite aim, clearly stated in the agreement, has generally been the cause of an A. Thus in 1688 the Triple A. between Great Britain, Sweden, and the Netherlands had as its object the diminution of the power of Louis XIV. The Grand A. of 1689 was formed for the same object. The Quadruple A. of 1814 between Great Britain, Austria, Russia, and Prussia was directed against Napoleon and his dynasty, and towards keeping back France within her boundaries. The object of the Triple A. of 1882 between Germany, Austria, and Italy was the preservation of European peace against any possible aggressive action of Russia or France. This led to the Dual A. of France and Russia, having as its object mutual help in case of any hostile action on the part of the aforementioned powers. Sev. attempts have been made to generalise the character of A. For example, the Holy A. of 1815 was an attempt to find in the teaching of the Gospels a common basis of a general league of the European govts., having as its object the preservation of peace. One of the most important A.s of modern times was the offensive and defensive A. effected between Great Britain and Japan in 1902 and modified in 1905. The terms of this A. were pub. to the world. It terminated in 1921 as a result of the Washington Conference. On the outbreak of the First World War the Triple A. broke up owing to the refusal of Italy to act with Germany and Austria-Hungary.

The Triple Entente, or informal A., before the First World War embraced Great Britain, France, and Russia, and was concluded in 1907. Although at this time a formal A. existed between France and Russia, there was no binding agreement between the 3 powers to take a common course should one be engaged in war. In order to strengthen this bond and to have a clear understanding on the matter, the 3 powers signed the Pact of London in 1914, each declaring that it would not conclude a separate peace or demand terms at the eventual peace conference without consulting the others. Japan signed the pact soon after. The Bolsheviks concluded a separate peace with the central powers in 1918 and broke up the Triple Entente. Great Britain's A. with Portugal provides for mutual assistance if either of the 2 countries were attacked; but it involved no obligation for Portugal to fight in the Second World War, and she remained neutral. In view of the menace of Germany's policy of European domination, Great Britain, in conjunction with France, in 1939, made pacts with Rumania, Greece, and Poland, guaranteeing their integrity, her policy being to form a peace bloc which should serve as a substitute for the collective security it was, at one time, hoped to procure under the League of Nations (q.v.). In the result the guarantees brought a Brit. declaration of war against Germany on the latter's invasion of Poland. An Anglo-Fr.-Turkish pact of assistance was signed in 1939, valid for 15 years, which provided, *inter alia*, that

Turkey was to aid Britain and France in the event of aggression by a European power leading to war in the Mediterranean, and if Britain had to fulfil her guarantees to Greece, but these undertakings were not, in fact, fulfilled. See also EUROPE, *History of Europe during the Second World War (1939-45)*, and LOARNO TREATIES.

Alliance, Holy, see HOLY ALLIANCE.
Alliaria petiolata (synonyms *A. officinalis*, *Erysimum alliaria*, *Sisymbrium alliaria*), commonly called Garlic Mustard, Jack-by-the-Hedge, Hedge Garlic, Sauce-alone, is a biennial herb, family Cruciferae, indigenous to Great Britain and many parts of the N. hemisphere.

Allibone, Samuel Austin (1816-89), Amer. author, b. Philadelphia, Pennsylvania. He became librarian of the Lenox Library, New York City, in 1879. He is best known for his critical dictionary of Eng. literature (3 vols., 1858-71, with supplement by J. Foster Kirk, 1891), which is still of service.

Alliote, see SHAD.

Allier: 1. Fr. riv., rising in the Margeride Mts in the dept of Lozère, and flowing NNW. to join the Loire. It is the boundary between the depts of Cher and Nièvre. Length 250 m.

2. Dept of central France, formed of part of the anct prov. of Bourbonnais. Its surface features are diverse: in the W. is the plateau of Combrailles, and in the centre the low spurs of the Auvergne Mts, fertile and rich in minerals; the region of the Sologne in the NE. is covered with forests and small lakes. Cattle and poultry are raised, and cereals, vines, beet, and vegetables are produced. Coal, iron, and antimony are mined. There are metallurgical, glass, textile, porcelain, and leather industries, and there are several spas. The prin. tns are Moulins (the cap.), Montluçon, and Vichy (qq.v.). Area 2848 sq. m.; pop. 372,700.

Allies, Thomas William (1813-1903), Eng. historical writer, b. near Bristol. Became a fellow of Wadham College, Oxford, in 1833. In 1850 became a Rom. Catholic, after resigning the living of Taunton. Secretary of Catholic Poor Schools Committee and lecturer on hist. in the Catholic Univ. of Ireland. His chief literary work was *The Fountain of Christendom* (8 vols.), 1861-95.

Alligator (Sp. *el lagarto*, the lizard), of family Crocodylidae and order Crocodylia, is a reptile of which there are only 2 living species: *A. lucius*, in the Mississippi and other large rvs. of America, and *A. sinensis*, in the Yangtsekiang. It differs from the caiman (q.v.) by having a bony septum between its nostrils, and its ventral scutes are thinly, if at all, ossified; it differs from the crocodile (q.v.) by having a broad head, depressed and obtuse muzzle, unequal teeth, the fourth from the front on each side of the lower jaw being elongated and fitting into a cavity in the upper jaw when the mouth is closed, the hinder limbs lack a fringe of acute scales, and the toes are only slightly webbed. It is a carnivorous and piscivorous animal, and will devour dogs or pigs, but seldom attacks man unless

molested. The strong tail by its lashing movement assists it in swimming, during which exercise it emits a loud bellowing. The eggs are deposited in layers in sand, and incubation covers a period of about 3 months. The female A. is a tender mother, providing food for her young and guarding them from their many foes, such as large fish and turtles. The skin



ALLIGATOR

Mirrorpic

of the A. is a valuable object of commerce, used in the manuf. of purses, cigarette-cases, and other articles, and the teeth are sold for ivory. From the Upper Cretaceous to the Pliocene period these animals ranged N. Europe.

Alligator Apple, or **Corkwood**, *Annona glabra*, family Annonaceae, a swamp tree, which bears an inedible cone-shaped fruit.

Alligator Lizard, or **Swift**, names applied to sev. species of *Sceloporus*, family Iguanidae of the Lacertilia. They are viviparous and are found in N. and central America.

Alligator Pear, see AVOCADO PEAR.

Allin, **Sir Thomas** (1612-85), a naval commander, b. at Lowestoft. A. took a prominent part in the Royalist struggles. He was sent as Commander-in-Chief to the Mediterranean, where he captured sev. Dutch men-of-war. He brought the Barbary States to subjection in 1669. In 1670 he was controller of the navy, and in 1678 was Commander-in-Chief in the Channel. His life throughout was one of stirring sea adventure.

Allingham, **Margery** (1904-), writer of detective stories, b. London. She was trained to write by her father, who was also a writer, and in 1927 married P. Y. Carter, editor of the *Taller*. Albert Campion, the detective in her stories, is human and attractive, among the best known of his exploits being *Mystery Mile*, 1930, *Flowers for the Judge*, 1936, and *More Work for the Undertaker*, 1949. *Mr Campion and Others*, 1939, is a vol. of short stories. *The Tiger in the Smoke*, 1952, was filmed in 1956. Best-known of her other books is a commentary written during the war, *The Oaken Heart*, 1941. See also DETECTIVE STORY.

Allingham, **William** (1824-89), poet, b. Ballyshannon. Donegal. Entering the customs service, he worked in various places in England and Ireland till 1870, when he retired and became sub-editor of *Fraser's Magazine*. He became the friend of Tennyson, Leigh Hunt, Carlyle, and Rossetti, who figure in his *Diary*, ed. in 1907 by his wife, who was formerly Helen Paterson, the water-colourist. His books of verse include *Poems*, 1850, *Laurence Bloomfield in Ireland*, 1864, and *Irish Songs and Poems*, 1887.

Alliteration (Lat. *ad*, to; *litera*, letter), sometimes called head-rhyme, is the repetition of the same letter or sound in a series of words, usually at the beginning, as in Coleridge's lines:

'The fair breeze blew, the white foam flew,
The furrow followed free.'

In Eng. poetry, and to some extent in Eng. prose, it is used as an embellishment which enriches the musical effect of the rhythm. Its excessive use is sometimes seen in such poets as Swinburne, and 'hunting the letter' has been ridiculed at different periods, from 'The preylful princess pierced and pricked a pretty pleasing pricklet' of Shakespeare's *Holofernes*, to Charles Churchill's ironic 'Apt alliteration's artful aid.'

A. is traditional in Eng. literature, the earliest Eng. poetry being alliterative without rhyme. The usual metrical device was to have in each line 3 (or 4) stressed syllables beginning with the same consonant, 2 being in the first half of the line, and 1 (or 2) in the second. The last noteworthy Eng. exponent of purely alliterative verse was Wm Langland (c. 1332-c. 1400), whose *Vision Concerning Piers the Plowman* begins with the lines:

'In a somer seson, when soft was
the sonne,
I shope me in shroudes, as I a shepe
were.'

With the introduction of rhyme the use of A. receded. See also FIGURE OF SPEECH.

Allium, genus of bulbous plants, about 280 species, family Liliaceae. See ONION.

Allmers, **Hermann** (1821-1902), Ger. poet and artist, b. Rechtenfleth, near Bremen. His first pub. was *Marschenbuch*, a study of Frisian peasant life. His best work is perhaps his tragedy *Elektra*. Others are *Dichtungen* and *Römische Schlendertage*.

Alloa, burgh and co. tn of Clackmannanshire, Scotland, on the Forth, 6 m. E. of Stirling; has breweries, distilleries, glass-works, woollen manufs., engineering works, etc. Pop. 13,436.

Allobarbitone, see BARBITURATES.

Allobroges, anct Gallic tribe, occupying the land between the Rhône and Isère, now Savoy and Dauphiné. Their chief cities were Vienna (Vienne), Genava (Geneva), and Cularo (Grenoble). They were subdued by the Romans, 121 BC.

Allucation (Lat. *alucatio*, a speaking to), term denoting the formal address given by the Pope to the College of

Cardinals on any matter of eccles. or political moment, and affixed to the door of St Peter's.

Allodium, or **Allodial Tenure**, legal term used to signify land which is the absolute property of its owner, free from any feudal tenure or obligation to a superior. Since the Norman Conquest there had been no allodial land in England, for the laws declare all land to be the property of the sovereign. Before the Conquest the right was held to a certain extent, and it was common throughout the rest of N. Europe. In Scots law the term is applied to all movable property and to crown lands, and land bought under the Scots Lands Clauses Consolidation Act. The term is also applied to the udal land in the Orkney and Shetland Is.

Allogamy (Gk *allos*, other; *gamos*, marriage), or cross fertilisation, the transference of the pollen of one flower to the pistil of another. There are 2 types—(1) Geitonogamy, in which the fertilised flower is on the same plant; (2) Xenogamy, in which it is on another plant.

Allopathy, usually applied to the orthodox method of therapeutics as opposed to homoeopathy (q.v.). Hahnemann, the inventor of the term and the promulgator of homoeopathy, designated as A. that method of the treatment of disease consisting in the use of medicines the action of which upon the body in health produces morbid phenomena different from those of the disease treated. Homoeopathy, on the other hand, consisted in the use of medicines which, by experiment on persons in a state of health, are known to produce morbid phenomena similar to those of the disease treated.

Allophane (Gk *allos*, other; *phainein*, to appear), hydrous aluminium silicate of blue, green, or brown colour, found in Saalfeld and Schneeberg (Germany).

Allori, Cristofano (1577–1621), Florentine painter, son of the painter Alessandro Allori (1535–1607) (q.v.). He studied under Paganini, who followed the Venetians in colour. His most celebrated work is 'Judith with the Head of Holofernes' in the Pitti Palace, Florence. His works are distinguished by delicacy, rich colouring, and technical accuracy.

Allotments. An allotment in England and Wales is defined by statute as a piece of land, not more than 5 ac. in extent, which is cultivated as a farm or garden, or, in other words, it is a small agric. holding. 'A time there was ere England's griefs began, When every rood of ground maintained its man,' wrote the poet Goldsmith; but that time began to decline in the 15th cent., and continued till at the present day the great mass of the people are divorced from the land, and even those still engaged in agric. were only in the position of hirelings of large landowners. In the spacious days before the rise of modern industrialism, and before the numerous inclosure Acts of the 17th, 18th, and 19th cents., each cottager had his own small parcel of land which he cultivated, and in addition he had the right of turning

his cattle, swine, and geese out to graze on the common land. The Georgian parliaments, consisting mainly of the representatives of the landed class, passed Inclosure Act after Inclosure Act, enclosing as much as 7,000,000 ac. of common land between 1760 and 1867. To compensate the cottagers for their lost grazing rights many of these Acts provided that garden A. should be reserved for them. This benevolent intention seems to have failed in the working, for while between 1845 and 1867 nearly half a million ac. of land were enclosed, only 2119 ac. were set aside for the poor. Alarmed by the rapid decline in the agric. pop. due to the lure of the tns, with their greater opportunities, higher wages, and less monotonous existence, the policy of the 19th cent. was to check the flow towards the tns by giving the agric. labourer some inducement to remain in the country, so that Acts for the provision of A. and small holdings were almost as numerous as Inclosure Acts in the previous cent. Incidentally it was also discovered that the parcelling of land into small holdings was a profitable thing for the landlord, the fork and spade husbandry of the allotment being much more effective than the plough. In 1819 and 1831 the first Acts making provision for A. were passed, and the series of Acts which followed were consolidated in the Small Holdings and Allotments Act, 1908. Most of these Acts aimed at giving compulsory powers to local authorities, and in some cases laid on them the duty, to provide A. The Parish Councils Act, 1894, gave a stimulus to this matter, and during the first 4 years of its working nearly 15,000 ac. were allotted by the councils to 32,000 tenants. An allotment does not generally exceed in size a quarter of an ac., the underlying idea being that its size should not exceed that which can be cultivated during the spare time of the labourer; but a small holding is the term applied to an agric. holding of from 1 to 50 ac. Additional powers have been conferred on local authorities by various Acts passed since the First World War. Under the Allotments Act of 1919 a co. council may acquire land for leasing to a par. council of A., but the allotment may be let only to residents or to persons working on a co-operative system, or let to A. associations. Statutory powers are also given to local authorities to acquire land compulsorily for A., or, with the consent of the Ministry of Agriculture, land held by them for other purposes may be appropriated to A. Under the Act of 1925, the Public Works Loans Commissioners may lend to any 'approved society' (i.e. a society registered under the Industrial and Provident Societies Acts or under the Friendly Societies Acts) money to purchase land for A. Compensation for improvements is provided for by the Allotments Act of 1922, and, in this context, an 'allotment' means any piece of land, whether attached to a cottage or not, of not more than 2 ac., held by a tenant and cultivated as a farm or a garden or as both. For the purposes of

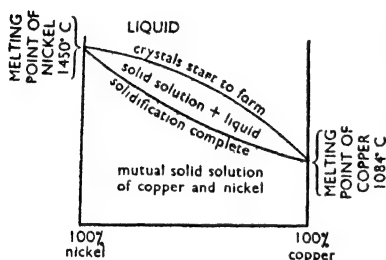
the Act of 1925 an 'allotment' includes any piece of land of not more than 5 ac. Every local authority preparing a town-planning scheme must consider what provision ought to be made for reserving land for A. (including allotment gardens, i.e. A. not exceeding 40 poles and wholly or mainly under crops or vegetables for consumption by the cultivator or his family) and must at least once a year consider whether any and if so what lands within the area of the scheme are needed for A. (Act of 1925). By the Act of 1925 a bor. or an urb. dist. council may acquire land for future A. with the approval of the Ministry of Agriculture.

Allotropy, the property which some chemical elements possess of existing in different modifications under different circumstances. Sulphur may exist as

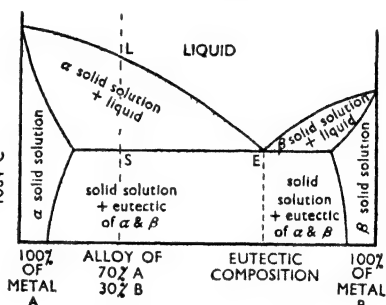
important decomposition product of uric acid. It is obtained by oxidising the uric acid with nitric acid. On treatment with alkalis it takes up 2 molecules of water, producing urea and mesoxalic acid.

Alloxantin, substance formed by the reduction of alloxan by dialuric acid, or directly from uric acid by evaporating to dryness with nitric acid. Treated with ammonia, it forms a purplish-red dye, *murexide*, a test for uric acid being thus provided.

Alloy, substance formed by the union of 2 or more metals. There are 3 ways of bringing about this union. The first is by powder metallurgy (see METALLURGY). It is also possible to bring about the deposition of an A. by the electrolysis of a solution of a mixture of 2 metallic salts (see ELECTRO-METALLURGY). The



NICKEL-COPPER PHASE
DIAGRAM



EUTECTIC TYPE OF PHASE
DIAGRAM

octahedral or prismatic crystals, or as an amorphous powder, or yet again in a plastic form. Carbon may exist in any of the 3 forms, diamond, graphite, and amorphous charcoal or lampblack. Phosphorus may exist in white and red crystalline modifications. Oxygen is found as the ordinary constituent of air or as the ozone which is produced in the neighbourhood of an electric discharge. In this case, however, it is known that the combination of atoms in the molecule is different, as ozone is one and a half times as dense as oxygen; that is, the formula for oxygen is O_2 and that of ozone O_3 . A. is not confined to non-metals; thus tin, silver, antimony, arsenic, and other metallic or metalloid elements exist in allotropic forms. A. is explicable on the assumption that the molecules of the different forms are of dissimilar structure.

Alloway, vil. on the banks of Doon, Ayrshire, Scotland, since 1935 part of the royal burgh of Ayr and 2½ m. from its centre, bp. of Robert Burns. The cottage in which the poet was b. has now been converted into a museum. Here also is the 'kirk' which he celebrates in *Tam o' Shanter* as the scene of the witches' dance, and the 'Auld Brig' over which *Tam o' Shanter* escaped.

Alloxan ($C_4H_2O_4N_2$), or mesoxalylurea,

third method, that of the greatest commercial importance, is the fusion of the metals at a temp. high enough to form a uniform liquid. The temp. of the liquid must not be above that required to melt the constituent with the highest melting point, since the melting-point of an A. is often lower than that of the pure constituents. Usually the metal constituting the major proportion of the A. is melted first and the other alloying elements dissolved in the liquid to form a homogeneous molten A.

Metallic crystals are usually of 3 types: body-centred cubic, face-centred cubic, and hexagonal close packed (see METALS). If the atoms of one metal are added to atoms of another to form an A., the second metal will generally form a solid solution (analogous to a liquid solution) with the first and the structure will be of the same type as that of the first if only a few atoms are added. As more atoms of the second metal are added a point may arrive when a second phase with a different crystal structure is formed and later, as still more atoms are added, a third and fourth phase may be present. Solid solution phases are, as a rule, very ductile and are therefore required for A.s which have to be cold-formed, e.g. cartridge brass for deep-drawing into cartridge

cases. Such A.s, however, have not the high strength required for structural purposes, and a composition is chosen which provides a sufficient proportion of a second, more rigid phase; a less ductile solid solution, or, better still, an inter-metallic compound. The latter are hard and brittle and provide the A. with stiffness while the solid solution supplies the ductility which prevents it from breaking under shock. Steel is a good example of this where the compound iron carbide stiffens the soft iron. Research has revealed some of the laws which govern the crystal structure of the various phases which occur in an A. It has been found that these depend upon such factors as the relative sizes of the atoms concerned, the system in which each crystallises, their relative positions in the electromotive series, and the ratio of electrons to atoms.

Phase diagrams are diagrams in which the various phases in an A. are represented when the percentage composition is plotted against temp. The simplest is exemplified by A.s of copper and nickel in which a single solid solution is present over the whole range from 100 per cent copper to 100 per cent nickel. It will be noticed that although the pure metals solidify at fixed temps. the A.s have a 'mushy' range in which both solid and liquid are present together. In another very common type of diagram there are two phases present, the α and the β solid solutions. Suppose an A. consists of 70 per cent of metal A and 30 per cent of metal B. As this A. cools, the α -solid solution begins to crystallise at point L; at point S the remaining liquid solidifies and consists of both the α and the β solid solutions together in the ratio given by point E. E is called the eutectic. Under the microscope a eutectic has a very characteristic appearance, showing most commonly layers of one solid solution alternating with layers of the other, or dots of one in a background of the other.

Allspice, the dried berries of A. tree, *Pimenta officinalis*. See PIMENTO.

Allston, Francis, see CHANNING, 1st BARON.

Allston, Washington (1779-1843), Amer. painter and author. b. at his father's plantation at Waccamaw, S. Carolina. In 1800 he graduated at Harvard, after which he visited London, Paris, and Rome to study art. He was a friend of Benjamin West, was admired by Coleridge, and is akin in romantic imagination to John Martin (q.v.). In 1818 he finally returned to America. His pictures are numerous, the best known being 'The Dead Man Revived,' 'St Peter liberated by the Angel,' and his unfinished 'Belshazzar's Feast.' He pub. a poem, *The Sylphs of the Season*, 1813; a novel, *Monaldi*, 1841; and *Lectures on Art*, 1850.

See J. B. Flagg, *Life and Letters of Washington Allston*, New York, 1892.

Alluvium (Lat. *alluvio*, washing against), legal term for land gradually formed by deposit from the sea or some other water. The process must be gradual. A. becomes the property of the owner of the land to which it is attached.

Alluvium (Lat. *ad*, towards; *luere*, to wash), or **Alluvial Deposits**, name given to those accumulations of sand, earth, and loose stones or gravel brought down by streams and rivs. and spread out over lower lands, which are called *alluvial lands*. The term is sometimes also applied to the deposits at the mouth of a riv. entering the sea, when they are known as *marine alluvia* to distinguish them from the *fresh-water alluvia*.

Allyl, unsaturated organic radical corresponding to the formula $\text{CH}_2:\text{CH}:\text{CH}_2$. The chief compounds are: A. *alcohol*, with the general properties of a primary alcohol; A. *iodide*, a colourless liquid with an odour of garlic; A. *bromide*, a heavy liquid obtained by treating A. alcohol with phosphorus tribromide; A. *sulphide*, or 'oil of garlic,' obtained by macerating garlic; and A. *isothiocyanate*, or 'oil of mustard,' occurring in black mustard seeds.

Al'ma, small riv. in W. Crimea. On its banks the combined armies of Britain, France, and Turkey defeated the Russians on 20 Sept. 1854.

Alma-Ata: 1. Cap. of Kazakh S.S.R. of the Soviet Union. Founded in 1854 as Russian fortress of Vernyy, it became the cap. in 1929. It has a heavy machine-building industry, fruit-preserving and meat packing plants, a univ., and an academy of sciences. Pop. 320,000.

2. Oblast of Kazakh S.S.R., extending along the Ili R. from Lake Balkhash to the Chinese border. The economy is entirely agric. Pop. 520,000.

Alma Mater (Lat. 'nourishing mother'), the name given to a univ. to express its relation to those educ. at it—its *alumni* or foster-children.

Alma-Tadema, Sir Laurence, O.M. (1836-1912), artist of Dutch extraction, b. Dronryp, Friesland. He studied painting first at the Antwerp academy, and later under Baron Leys. He followed Leys in devoting himself to the reconstruction of the past, painting chiefly classical subjects. About 1870 he settled in London and became a naturalised Englishman. In 1879 he was made a member of the Royal Academy, and he received a knighthood in 1899. His work is remarkable for its archaeological accuracy, though its sentiment was late-Victorian. Some of his works are 'The Education of the Children of Clovis,' 1861, 'Pyrrhic Dance,' 1869, 'The Vintage Festival,' 1876, 'The Seasons,' 1877, and 'Roses of Heliogabalus,' 1888. He had the distinction of being one of the artists selected for the Order of Merit. See H. Zimmern, *L. Alma-Tadema, his Life and Work*, London, 1886, and G. Ebers, *L. Alma-Tadema*, trans. New York, 1886.

Almacantar, see ALMUCANTAR.

Almack's, see CLUBS.

Almada, tn of Portugal, in Setúbal dist., 16 m. NW. of Setúbal (q.v.). It is on the S. bank of the Tagus (q.v.) estuary, opposite Lisbon. There are cork and food-preserving industries. Pop. 5800.

Almaden (anct. *Sisapon*), Sp. tn in the prov. of Ciudad Real, in the Sierra

Morena (q.v.), containing the most ancient mercury mines in the world. In the 16th cent. the mines were worked by the Fugger (q.v.) family. Pop. 13,000.

Almagest, name of an important astronomical and mathematical work of Claudius Ptolemaeus, or Ptolemy, one of the most celebrated savants of the Alexandrian school. This work was probably written between AD 140 and 150, in the reign of the Rom. Emperor Antoninus Pius, and was divided into 13 sections or 'books.' To distinguish it from other important works of the same author, it received the Gk appellation *megiste*, 'the greatest,' from which its modern name, with the addition of the Arabic definite article *al*, 'the,' is derived. In it is set forth the theory of the solar system, designated the Ptolemaic system, which held the unchallenged sway in the realm of astronomical science during the Middle Ages that the works of Aristotle did in other branches of knowledge. For an account of this system see **PTOLEMAIC SYSTEM**.

Almagra (Arabic), species of ochre of a dark red colour formerly used as a skin paint and general dye (q.v.).

Almagro, Diego d' (c. 1475-1538). Sp. soldier and explorer, b. Aldea del Rey. In 1524 he joined Pizarro in a scheme for the conquest of Peru. Ultimately the two quarrelled over the div. of terr., and in 1538, after a battle near Cuzco in which Pizarro was victorious, A. was put to death.

Almanac, book or table containing a calendar of the days, weeks, and months of the year, with the addition of notices of astronomical phenomena, of eccles. feasts, and similar useful information. Authoritative A.s are pub. by the govts. in most countries, and from these the smaller ones are compiled. Such are the *Nautical A.* in Great Britain, the *American Ephemeris and Nautical A.* in the U.S.A., and the *Almanach de Gotha*, pub. in Germany and France; the Berlin *Astronomisches Jahrbuch* and the Fr. *Connaissance des temps* contain additional astronomical information. These works are pub. some years in advance, and contain tables of the predicted positions of sun, moon, and planets, and of all the fixed stars used in navigation. Statistics of various kinds are also given. The *Almanach de Gotha* contains lists of the statistics of politics, pop., sovereigns, army, etc., for every state. More popular works are *Whitaker's Almanack* in England, containing much information, *Oliver and Boyd's New Edinburgh A.* in Scotland, and *Thom's Irish A.* for Ireland.

The hist. of the A. in the E. goes far back. Its use is known of from the 13th cent. onward in England. The first printed A. was that of Purbach, 1450-61, and this was soon followed by the more important work of Regiomontanus, which covered the years from 1475 to 1531. The early A.s generally took the name of 'Prognostications,' and these prophetic A.s had a huge circulation among the unlearned. In the reign of James I the

monopoly for their production was granted to the 2 univs. and the Stationers' Company. Of this type of pub. are *Old Moore's* and, in America, *Poor Richard's A.* The sale of such works of fiction is now considerably restricted. Partridge, the A. maker of the Stationers' Company, has been immortalised by Dean Swift in the famous *Bickerstaff Papers*, 1708. See **CALENDAR** and **CHRONOLOGY**.

Almandite, or **Almandine**, variety of garnet, composed of silica, alumina, and protoxide of iron, and either deep red in colour and transparent, brownish and translucent, or black (melanite). It includes the one popular carbuncle (q.v.). According to Pliny, it was named after Alabanda, a city of Caria where the mineral was cut and polished.

Almansa, Sp. tn in the prov. of Albacete, at the foot of a hill on which stands a ruined Moorish castle. Near by the Duke of Berwick (q.v.) defeated the English and Spanish in 1707. Textiles and leather goods are manuf. Pop. 15,800.

Almansur (Arabic 'the Victorious'), **Abu Jaffar Abdallah** (c. 712-75), second caliph of the Abbasid dynasty, succeeded his brother in 754. During his reign he lost Spain and Africa, and persecuted the Syrian and Egyptian Christians. He founded Bagdad.

Alme, **Aimel**, or **Al-mal**, i.e. 'the learned,' is the name given by the modern Egyptians and Arabs to the Egyptian singing girls (not to be confused with the ghawāzi or dancing girls) who attend festivals, marriages, funerals, and other ceremonies. They are also found in Syria and other parts of the Ottoman empire.

Almeida, tn of Portugal, in Guarda dist., 25 m. NE. of Guarda (q.v.), near the Sp. frontier. It was once an important fortress, and was taken by Spain in 1762. During the Peninsular War (q.v.) it was captured by the French in 1810, but was recovered by the British and Portuguese in 1811. There is a trade in agric. produce and olive oil. Pop. 3000.

Almeida-Garrett, João Baptista de (1799-1854), Portuguese poet and politician, leader of the Portuguese Romantic movement, b. Oporto. He took an active part in the political movements of his country. Of his romantic plays *Frei Luis de Sousa*, built on the pattern of the classical Gk tragedy, is considered the best national drama of Portugal. His other works include an epic poem called *Dona Branca*, *Romanceiro*, a collection of Portuguese folk-tales, and *Folhas caídas*, a vol. of lyrics.

Almeirim, tn of Portugal, in Santarém dist., 4 m. SE. of Santarém (q.v.). It was an ancient residence of the kings of Portugal, and is the centre of a fruit- and wine-producing region. Pop. 6800.

Almelo, tn in the prov. of Overijssel, Netherlands, 28 m. SE. of Zwolle. It is situated on the Overijssel Canal, and has weaving and spinning mills. Pop. (1954) 46,225.

Almería: 1. Sp. prov. in Andalucía (q.v.) with a coastline on the Mediterranean. It was once part of the ancient

kingdom of Granada (q.v.). It is hilly except in the coastal regions, and has rich deposits of copper, iron, silver, lead, and mercury. Cereals and fruit are grown, and wine is produced. Area 3389 sq. m.; pop. 356,850.

2. Sp. port, cap. of the prov. of A., in the Gulf of A. on the Mediterranean. During the time of the Moors it was, after Granada (q.v.), the richest tn in the kingdom, and was the arsenal for the fleet. It is still Moorish in appearance, and is dominated by a great Moorish fort. It has a fine 16th-cent. cathedral, and exports oranges, grapes, and esparto. Pop. 75,750.

Almodovar del Campo, Sp tn in the prov. of Ciudad Real, the centre of an agric. dist. It was once a Moorish fortress. Pop. 7000.

Almogia, Sp. tn in the prov. of Málaga, with a trade in fruit and wine. Pop. 4000.

Almohades, Berber dynasty that ruled N. Africa and the Muslim half of Spain during the 12th and 13th cents. The founder of the dynasty and the cult (the name, lit. *Al-muwah-hidun*, means Unitarians—those laying particular stress on the unity of God, as opposed to the current anthropomorphism) was Mohammed ibn Tumart. He, with his lieutenant and successor, Abd-el-Mumin, dethroned the Almoravide dynasty (q.v.) and conquered N. Africa. The dynasty was fanatical and purely military, yet it retained its power intact until 1212, when its decline began in the defeat of Navas de Tolosa. The line ended in 1269.

Almon, John (1737–1805), bookseller and pamphleteer, friend of John Wilkes, b. Liverpool. His business premises were in Piccadilly. Among his pubs. were the *Parliamentary Register*, 1774, and the *General Advertiser*, 1784. In 1786 the Crown moved to try him for publishing the pamphlet *Juries and Libels*, but the prosecution failed. For selling a copy of the *London Museum* containing Junius's 'Letter to the King' he was fined and bound over, 1770. He pub. Wilkes's correspondence, with a memoir, 1805.

Almon, name of an affluent of the Tiber in anct Latium, where the votaries of Cybele purified themselves, and where every year the image of the goddess was bathed.

Almond, trib. of the Tay, flowing into that riv. 2 m. above Perth.

Almond is a name applied to sev. plants. The common A. is *Prunus communis*; the Bitter A., its variety *amara*; it is grown in England for its pink flowers. It yields an oil, and the seeds are eaten as dessert. See PRUNUS.

Almondbury, see HUNDERSFIELD.

Almonds, Oil of, fixed oil obtained from the dried ripe kernel of both sweet and bitter almond trees, but more usually from the latter as the residual cake is of more value. It has a yellowish colour and slight characteristic odour; it consists mainly of glyceryl oleate and is used in cosmetics and medicine. Oil of bitter A. is obtained by maceration and

distillation from bitter almond cake. It is a volatile almost colourless oil, and has a characteristic odour. The odour is due to benzaldehyde, which constitutes about 90 per cent of the whole and is formed together with benzaldehyde-cyanhydrin, hydrocyanic acid, and a glucoside gentiobiose, by the action of the enzyme emulsion (syntapase) on amygdalin during maceration. Benzaldehyde is often called 'oil of bitter almonds' and is used for flavouring purposes and in perfumery and dyestuffs.

Almoner (O.F. *almosnier*; Lat. *elemosynarius*), originally the officer of a religious house appointed to distribute to the poor the alms of the house, one-tenth of the revenue. Bishops and sovereigns also had A.s. In England the lord high A., usually a bishop, distributes, twice a year, the sovereign's bounty.

Hospital Almoners were introduced into hospitals (q.v.) to prevent abuse by persons able to pay for treatment and to assess the contributions of those able to pay part of its cost. They first joined the Royal Free Hospital (q.v.) about 1895, and other hospitals appointed A.s during the next decade. Gradually other duties were added concerning the social services and after-care. Since the introduction of the National Health Service (q.v.) in 1948, A.s are no longer concerned with the financial position of the hospital but solely with the patient, and they link up the hospital services with the general-practitioner and local-authority services. Their social service activities include the after-care, resettlement, and rehabilitation of the patient. Over 1000 A.s are now employed in hospitals in Britain. The Institute of Almoners, Tavistock House North, Tavistock Square, London, W.C.1, is concerned with the selection, training, and certification of A.s. See I. F. Beck, *The Almoner*, 1948, and *Ten Patients and an Almoner*, 1956.

Almonte, tn in the prov. of Ontario, Canada, and a centre for the manuf. of woollen goods. Pop. 2595.

Almoravides, Berber dynasty which ruled over Morocco and part of Spain during the 11th and 12th cents. The line was founded by Abdallah ibn Yaseen, who about 1050 preached a holy war. Aided by his brother Abu Bakr, he conquered most of Morocco. On his death he was succeeded by Yusuf ibn Tashfin, who completed the conquest of Morocco and extended his power into Spain in 1086. He defeated the Christians at Sacralias, but was then obliged to return to Africa. In 1090, however, he returned and took the complete control of Mohammedan Spain. The dynasty was supplanted in 1147 by the Almohades (q.v.).

Almqvist, Carl Jonas Ludvig (1793–1866), Swedish author, b. Stockholm. After being in turn civil servant, farmer, schoolteacher, cleric, and journalist, his true literary career began in 1832 with the first of his series of romances, called *Törnrosens bok*. His succeeding pubs., lyrics, dramas, philosophical, aesthetic, moral, and educational works, show

remarkable versatility. In 1839 he published his famous story *Det gdr an*, attacking the 'marriage of convenience.' His art evolves from a metaphysically inclined Romanticism towards Realism. In 1851 he fled to America, convicted of forgery and charged with murder. Later he returned to Bremen, where he lived under the name of C. Westermann till his death. See A. Werin, C. J. L. *Almqvist*, 1923; R. C. Berg, C. J. L. *Almqvist i landsflykten*; H. Olsson, C. J. L. *Almqvist till 1836*, 1937.

Almshouse, house built and endowed for the support of those disabled from work by age or poverty. The most ancient example is the hospital of St Cross, Winchester. The name 'hospital' is also used for A.s in Scotland. In 1853 charity commissioners were appointed to put down the many abuses of the system. See J. M. Hobson, *Houses of Pity*, 1926.

Almucantar, small circle of the celestial sphere that is parallel with the horizon of the observer, in other words, a parallel of altitude. The term is also applied to a telescope which is mounted in such a way that in its rotation about a vertical axis it sweeps out small circles in the heavens. The instrument is chiefly employed to determine the exact position of the observer's zenith, from which his latitude is found. The telescope is borne on a float in a tank of mercury.

Almufecar, Sp. tn in the prov. of Granada, on the Mediterranean. It has Rom. remains, including an aqueduct, and a Moorish castle. There are fine bathing beaches, and a trade in agric. produce and wine. Pop. 12,150.

Aln, riv. of Northumberland, England, rising 12 m. W. of Alnwick in the Cheviot Hills and flowing E. for 16 m. to enter the N. Sea at Alnmouth.

Alnus, genus of shrubs or trees, family Betulaceae, which grow in a temperate climate. *A. glutinosa* is the common or black alder, so called from the very dark hue of its bark. It inhabits swamps and meadows of Europe; the N. of Africa, Asia, and America; and is common in Britain. It grows from 30 to 90 ft high. The leaves are a rough oval, with toothed edges, and the flowers form small female catkins resembling cones and pendulous male catkins. The bark is valuable for tanning, while the young shoots dye various colours, particularly red and brown. The tree furnishes an excellent charcoal, second only to that of the black dogwood. The wood is extremely useful, being capable of enduring long immersion in water. Cabinet-makers employ it in the manuf. of what is known as Scottish mahogany.

Other species of A. are *A. incana*, the grey alder, which is found in Europe and N. America, and is noted for its non-glutinous leaves; *A. cordata*, the heart-leaved alder, which is a native of Naples; and *A. viridis*, the green alder, a European shrub.

Alnwick, cap. of the co. of Northumberland, England, 33 m. NW. of Newcastle, on the R. Aln. A. is a well-built tn, and interesting historical features include

remains of the old tn wall and of various abbeys. Pop. 7370.

Aloe, family Liliaceae, genus of succulent stemless and stemmed plants, chiefly S. African, or S. Arabia to India, of which cultivation goes back to early times. In gardens, A.s are chiefly grown for their decorative foliage; *A. variegata*, Partridge-breasted A., *A. cristata*, often bearing a raceme of reddish-yellow flowers, and *A. ciliaris*, with red flowers, are grown in greenhouses. *A. succotrina*, the first A. to be grown in Europe is an esteemed source of the bitter drug, Aloe (q.v.).

Aloes, known as Curacao, Socotrine, or Zanzibar A., drug prepared from the sap excreted by the cut leaves of various species of *Aloe* (q.v.), evaporated dry. Chief constituents are aloin and emodin; and the action that of a powerful cathartic, emmenagogue, and antelmintic.

Aloes Wood, also known as Agila Wood, Agallochum, Eagle Wood, Paradise Wood, and Calambac, is the heartwood of *Aquilaria ovata* and *Aquilaria agallocha*, found in tropical Asia. The innermost wood of these trees yields a fragrant resinous substance which is used in the E. as a perfume and as a medicine. It retains its fragrance for years, and was once more valuable than gold. It is thought to be the aloes mentioned in the Bible.

Aloidæ, Otus and Ephialtes, twin sons of Poseidon and Iphimedia, wife of Aloeus. They made war upon the gods, and to force an entrance to heaven piled Mt Pelion on Ossa. They were defeated by the immortals, and their doom was a warning to insolent mortals.

Along, Bay of, see HA-LONG, BAY OF.

Alonso, see ALFONSO.

Alopea (Gk *alôpēkia*, fox-mange), baldness. *A. areata*, patches of baldness appearing in an otherwise normal growth of hair. Often attacks young persons. The cause of *A. areata* is not known but it is not due to any serious constitutional disorder. It sometimes seems to be associated with eye-strain and also with dental sepsis. Again, nervous tension may play a part. Uncleanliness is not a cause, nor is A. infectious or contagious. It must be distinguished from ringworm (q.v.). The hair usually grows again in time, but sometimes in a different colour, perhaps white.

Alopecurus, family Gramineae, genus of ann. or perennial grasses known as Foxtail. *A. pratensis*, Meadow Foxtail, *A. geniculatus*, Marsh Foxtail, *A. bulbosus*, Tuberous Foxtail, *A. alpinus*, Alpine Foxtail, are perennial; and *A. myosuroides*, Black Twitch, is ann.; and all native of Britain.

Alora, Sp. tn in the prov. of Malaga. It has ant walls and towers, and a ruined castle. The dist is renowned for its fruit. Pop. 15,300.

Alost, see SHAD.

Alost (Elen. Aalst), tn in the prov. of E. Flanders, Belgium, on the R. Dender, here made into a canal. It contains the church of St Martin dating from 1498; manufs. lace and textiles. Pop. (1955) 43,500.

Aloysia, see LIPPIA.

Aloysius Gonzaga (Luigi Gonzaga), St. (1568-91), b. Castiglione. In 1585 he joined the Society of Jesus, despite parental opposition, and d. of the plague while ministering to the sick. Canonised in 1726, his feast is on 21 June.

Alp Arslan (Valiant Lion) (c. 1029-72), Mohammed ibn Daoud, second Persian sultan of the Seljuk dynasty. He came to the Persian throne in 1063, and pursued a career of conquest. He reduced Armenia and Georgia, and later won a great victory over the Gk emperor, Romanus Diogenes, whom he took prisoner, but released on payment of a large ransom. The sultan was assassinated by a prisoner whom he had condemned to death.

Alpaca, domesticated breed of cameloid mammals, supposedly derived from the wild guanaco. It is smaller than the llama, and is not, like that animal, used as a beast of burden. A.s are kept in large flocks in the Peruvian Andes, and their wool is shorn annually. The wool varies in colour from black to dark yellow, and is lustrous, silky, and fine. It has been used by the Indians for cloth from time immemorial, but it was not properly introduced into England till 1836. The name of Sir Titus Salt is historic in its connection with the estab. of A. factories.

Alpenhorn (Ger.), or **Alphorn** (Eng.), musical instrument used chiefly by the Swiss mountaineers to convey signals. It consists of a curved wooden horn with cup-shaped mouthpiece. The notes are the natural harmonics of the open tube.

Alpes, Basses-, dept. of SE. France, formed of part of Provence (q.v.). It is bordered on the E. by Italy, and consists of 4 arrons.: Digne, Barcelonnette, Castellane, and Forcalquier. The prov. is entirely in the Alps (q.v.), and has high mts in the N. and E.; the scenery in many places is very beautiful. The chief rivs. are the Durance (q.v.) and the Verdon. Stock-raising and forestry are the main occupations in the mts, and the growing of vines, fruit, potatoes, and olives in the valleys. The cap. is Digne (q.v.). Area 2697 sq. m.; pop. 84,400.

Alpes, Hautes-, dept. of SE. France, formed of part of the Dauphiné and part of Provence (qq.v.). It is bordered on the E. by Italy, and consists of 2 arrons.: Gap and Briançon (qq.v.). The prov. is entirely in the Alps (q.v.); in the E. are the slopes of the Cottian Alps. The chief riv. is the Durance (q.v.). There is much stock-raising, and some vines, fruit, and vegetables are grown. The cap. is Gap. Area 2178 sq. m.; pop. 85,100.

Alpes-Maritimes, maritime dept. of SE. France, bordered on the E. and NE. by Italy. It has a coastline on the Ligurian Sea in the S., and encloses Monaco (qq.v.). The dept. is formed of the old co. of Nice, and of part of Provence (q.v.); it consists of 2 arrons.: Nice and Grasse (qq.v.). The N. boundary is formed by the Maritime Alps (q.v.), from which sev. spurs run S. The coast, the Côte d'Azur, is the most westerly part of the Riviera (q.v.), and contains such resorts as Nice, the

cap., Antibes, Menton, and Cannes (qq.v.), in addition to Monaco. The chief riv. is the Var (q.v.). There are many mineral springs. Flowers, fruit, and early vegetables are grown, and there are olive-oil, perfume, and metallurgical industries. On the coast there is fishing for tunny and sardines. Area 1444 sq. m.; pop. 515,500.

Alpha and Omega (α and ω), first and last letters of the Gk alphabet, descriptive of God as being the beginning and end of all things.

Alpha Boötis, see ARCTURUS.

Alpha Particles, nuclei of helium atoms, emitted by certain radioactive substances at velocities about one-twentieth of the velocity of light. Rutherford, 1899, distinguished 2 types of radiation from a uranium compound, one of which is stopped by about 0.002 cm. of aluminium, and the other by about one hundred times this thickness. The former he called alpha-rays, now known as A. P., and the latter beta-rays (q.v.). Rutherford and his co-workers first showed, 1903, that the A. P. are positively charged and have a charge-to-mass ratio almost exactly one-half that of the proton (q.v.). In 1908 they found that each alpha particle carries 2 units of charge, and therefore must have approximately 4 times the mass of the proton, i.e. they are helium nuclei.

In this work Rutherford and Geiger used an electrical device for counting A. P. An improved form of this is the Geiger-Mueller (GM) counter (q.v.) which depends for its action on the ionisation produced in a gas by moving charged particles. The earliest detectors were zinc sulphide screens which produce minute scintillations when bombarded by A. P. Photographic plates which are blackened by A. P. were also used (see NUCLEAR EMULSIONS and WILSON CLOUD CHAMBER).

Geiger and Nuttall found that naturally produced A. P. have discreet energies, bearing an important relation to the half-life (T) of the emitting nucleus (see RADIOACTIVITY), $\log(1/T) = A \log E + B$, where E is the energy and A and B are constants. More searching investigations showed that A. P. of slightly different energies are emitted by the same nucleus and are accompanied by gamma-rays (q.v.).

The discovery of an unexpectedly large number of A. P. scattered through angles greater than 90 degrees by very thin films of gold led to Rutherford's famous theory of the nuclear atom (see NUCLEUS).

Alpha-Rays, see ALPHA PARTICLES.

Alphabet, from *alpha* and *beta*, the names of the first 2 letters of the Gk A. The A. is the last, the most highly developed, the most convenient, and the most easily adaptable system of writing (see WRITING). It is a collection of a small number (generally between 20 and 30) of symbols called letters, intended to represent the various sounds used by the human voice in speech. Perfection has not yet been reached by any A., although this end does not perhaps seem very difficult of achievement. Perfection in an A. implies the accurate rendering of speech-sounds; each sound must be

represented by a single constant symbol, and not more than one sound by the same symbol. As it is, all A.s omit symbols for some sounds, representing these, when necessary, by combinations of other symbols, by the addition of diacritical points or other marks, and so forth, while, on the other hand, most of the A.s contain redundant letters. An interesting instance in this connection is the representation of the sounds *sh* and *ch* (as in 'church') in various languages; while the Russian A. has a single symbol for the combination *sh-ch*, Czech (another Slavonic language) would use for it the combination *šč*, Polish (again a Slavonic speech) represents it by 4 consonants (*szcz*)—and so does English (the 4 consonants are *sch*, as in 'Aschchurch')—and German would need as many as 7 consonants for the transliteration of this combination, that is *schtch*. English has no single symbols to represent the sounds *ch*, *sh*, *th*, and so forth. On the other hand, some letters are used for two or more distinct sounds; in English, for instance, the letter *c* is sounded hard (*-k*) as in 'cross' and 'cursive', and soft (*-s*) as in 'precise' and 'cell', in addition to entering into the combination *ch*, and replacing the *k* in *ck*. Again, *q* and *x* are redundant; *q* only appears in the combination *qu*, which can always be represented by *kw*; and *x* can always be represented by *ks*.

Alphabetic writing is now universally employed by civilised peoples, and no other system of writing has had so extensive, so intricate, and so interesting a hist. The story of the A. from the end of the second millennium BC until to-day is, on the whole, not very hard to trace, though many details, and the origin of some individual A.s, are still uncertain. It is the pre- and proto-hist. of the A. that is still wrapped in obscurity, and the prin. problem—that of its origin—is still unsolved. Since classical times this problem has been a matter of serious study. The Greeks and Romans held 5 conflicting opinions as to who were the inventors of the A.: the Phoenicians, the Egyptians, the Assyrians, the Cretans, or the Hebrews. In modern times various theories, some not very different in part from those of ant. days, have been current. Some theories need not be seriously treated (such as that of the Nazi pseudo-scholars), as they are influenced by political considerations. The earliest modern view was that Egypt was the starting-place of the A. The Egyptian theory has been subdivided into three theories—the hieroglyphic, the hieratic, and the demotic. The Egyptian view was revived in 1916 by Dr (now Sir) Alan Gardiner and Prof. Sethe, dealing with the Early Sinaitic inscriptions (q.v.). Many scholars hold the opinion that in the Sinaitic inscriptions we have to do with a stage of writing intermediate between Egyptian hieroglyphics and the Semitic A. This theory cannot be upheld, although it may be agreed that we have in these inscriptions one of the earliest known attempts at alphabet writing.

The attempts made to show that the cuneiform (q.v.) scripts, either the Sumerian or the Babylonian, or the Assyrian; or else the syllabary of Cyprus (q.v.), or the Hittite (q.v.) hieroglyphics, are the true parents of the A. may be regarded as even less successful. The Cretan theory, suggested by Sir Arthur Evans, had recently many adherents. It is certainly true that many alphabetic signs have a resemblance to Cretan linear characters, but the similarity is only external. The same may be said about the theory, developed by Sir W. M. Flinders Petrie, that the A. descended from the geometric prehistoric marks employed throughout the Mediterranean area from the earliest times. Most unlikely also is Sir John Evans's suggestion that the letters were once pictures used as ideograms.

The solution of the problem may come from Palestine, where, since 1929, various late Bronze Age inscriptions (18th to 13th cents. BC) have been discovered, mainly at Lachish (q.v.). According to many eminent scholars the writing of these inscriptions, termed Early Canaanite (q.v.), constitutes an important missing link in the hist. of our A., representing the long-sought intermediate stage between the Early Sinaitic and the earliest known N. Semitic forms. It is, however, possible that the Early Canaanite script represents another effort of the second millennium BC to introduce an alphabetic writing. Similar efforts were probably the cuneiform A. of Ras Shamra, the ant. Ugarit; the pseudo-hieroglyphic syllabary of Byblos (q.v.), partly deciphered by the Fr. scholar Dhorme; and the scripts of a few enigmatic inscriptions of N. Egypt, of Balua' (Moab, Transjordan), and of the so-called proto-Arabic inscriptions found at Ur (Mesopotamia).

The prototype of the A. was not very different from that of the earliest N. Semitic inscriptions now extant, belonging to the last cents. of the second millennium BC. These inscriptions have been discovered since 1923 at Byblos and other places in Syria; the Gezer (q.v.) 'calendar,' belonging to the 11th cent. BC, and the Stone of Mesha (q.v.) or the Moabite Stone, belonging to the 9th cent. BC, are written in the same character.

It is usually believed by scholars that practically all existing A.s have a common origin, being descended from a Semitic one, probably from the N. Semitic A. The known facts about this original N. Semitic A. may be summarised thus: it was used by the Syro-Palestinian Semitic peoples in the last cents. of the second millennium BC and during the first millennium. It consisted of 22 letters, which correspond roughly to the first 22 letters of the Gk. A., but all the Semitic letters expressed consonants only, and the method of writing was uniformly from right to left. The order, the names, and the phonetic values of the early Semitic letters are preserved in the modern Heb. A. At the end of the second millennium BC or at the beginning of the first millennium, with the definite

or temporary decay of the great nations of the Bronze Age (the Egyptians, the Babylonians, the Assyrians, the Hittites, the Cretans), we enter a new historical world, in which Israel, Phoenicia, Aram, the Greeks, and the S. Arabians played an increasingly important part. These conditions favoured the development of 4 main branches of the A.: the Canaanite, the Aramaic, the S. Semitic, and the Greek.

The Canaanite main branch may be subdivided into the two following branches: (1) Pre-exilic or Early Heb. (employed by auct Israel in the first half of the first millennium BC), with its three secondary branches, the Moabite, the Edomite, and the Ammonite, and its two offshoots, the Samaritan and the script of the Jewish coins; (2) Phoenician, which can be distinguished into Early Phoenician, Phoenician proper, and Colonial Phoenician, out of which latter Punic or Carthaginian, neo-Punic, and probably also the Libyan and Iberian scripts, developed. All the alphabetic scripts W. of Syria seem to have derived, directly or indirectly, from the Canaanite branch, whereas nearly all the hundreds of alphabets of the E. apparently sprang from the Aramaic branch. The Aramaic A. probably originated in the 10th cent. BC, but the earliest Aramaic inscriptions belong to the 9th to 7th cents. BC. In the second half of the first millennium BC Aramaic became by far the most important and widespread script of the whole Near E. The direct and indirect descendants of the Aramaic A. can be divided into two groups: (1) the scripts employed for Semitic languages, of which six separate centres of development may be discerned: Hebrew, Nabataean-Sinaitic-Arabic, Palmyrene, Syriac-Nestorian, Mandaean, and Manichaean; the most important of them being Hebrew, in which the holy scriptures of the Jews are printed and the scrolls of the law are inscribed, and the Arabic A., which is after our own the most generally used in the world to-day; (2) the scripts adapted to non-Semitic tongues of central, S., and SE. Asia, which can be divided into eight main groups: Kharoshthi, Persian or Iranian (including the Avesta A.), Sogdian, Kōk Turkic and Early Hungarian, Uighur, Mongolian (including Kalmuck, Buriat, and the allied Manchu A.), Armenian-Georgian-Alban, as well as Brahmi, the mother-A. of the Indian and Further Indian main branches. Indian writing and its origin constitute a story in themselves, and so do other branches, such as Iranian or Pahlavi, Mongolian, and especially Armenian, Georgian, and Alban. The S. Semitic group of A.s remained mainly confined within Arabia, although a secondary branch spread westwards, and became the progenitor of the Ethiopic A., which through its offshoot, the Amharic script, is the only S. Semitic script still in use, and the only one in which a literature has been produced.

The earliest existing Gk records in alphabetic writing go back to the 8th cent. BC, but the introduction of the A. into Greece was doubtless much older

than this. Between the 2 extreme views, that which assigns the invention of the Gk A. to the 15th cent. BC, and that which places it in the 7th or 8th cent. BC, each cent. has its own advocates. Until recently the date usually preferred was the 9th cent.; nowadays an earlier date, such as the 10th or even the 11th cent., is more favoured. The Greeks had many local A.s; many little states had each its own variant, and it was long before anything like uniformity was introduced. Indeed, only by the middle of the 4th cent. BC had all the local A.s disappeared in favour of the Ionic, which thus became the common, classical Gk A. of 24 letters. The Greeks made a few important changes, the most remarkable of them being: (1) the introduction of vowel representation, consisting in the allocation of certain Semitic consonants to Gk vowel sounds; (2) the addition of certain letters for the representation of sounds not expressed by any of the Semitic letters, such as *ph*, *ps*, *kh*, and *x*; and (3) the different arrangements of the sibilants. Like the Semitic A.s, the earliest Gk A. was written from right to left, a style which was later superseded by the *boustrophedon* direction of writing, that is alternately from right to left and from left to right, as the ox draws the plough, but c. 500 BC the method of writing from left to right was generally adopted. In the course of its long hist. the Gk A. produced the following offshoots: the Asiatic A.s (Lycian, Phrygian, Pamphylian, Lydian, and Carian), the Coptic A., with its Nubian derivative, the Messapian A. (in S. Italy), the Gothic A., invented in the 4th cent. by the Gothic bishop Wulfila, the two early Slavonic A.s (Cyrillic and Glagolitic), with their descendants (Russian, Bulgarian, Serbian, Ukrainian, White Russian, and Old Rumanian), later adapted to numerous non-Slavonic languages, and the 3 Albanian A.s, which had very little, and only local, importance. However, the main significance of the Gk A. lies in the fact that through its chief (direct or indirect) descendants, the Etruscan and Lat. A.s, and the aforementioned Cyrillic A., it has become the prototype of all the European A.s.

It is commonly believed that the Rom. character was directly derived from the Greek; this theory is unlikely: the Etruscan A. seems to have been the link between the Greek and the Latin. The Etruscans, a people of uncertain origin and ethnic and linguistic affinities, were the leading power in Italy in the first half of the first millennium BC. They gave their name to Tuscany and the Tyrrhenian Sea (the Romans called them *Etrusci*, and the Greeks knew them as *Tyrsenoi* or *Tyrrhenoi*). The probable date of the introduction of the A. into Etruria is the 8th cent. BC, but only c. 400 BC did the classical Etruscan A. take its final form, having 20 letters, that is 4 vowels and 16 consonants. The following were the main offshoots of the Etruscan A.: the Picenian A. (on the It. Adriatic coast); the Venetic A. (in the modern Venetian region), the

MODERN HEBREW	NORTH SEMITIC OR PHENICIAN	EARLY HEBREW	EARLY GREEK	ETRUSCAN	EARLY LATIN	GREEK (CLASSIC)	RUSSIAN	LATIN (CLASSIC)	IRISH	GERMAN (BLACK LETTER)	ROMAN (ENGLISH)
א	𐤀	𐤁	Α	Α	Α↑	Α α	А а	A	Ⱡ ⱡ	Ɽ a	A a
ב	𐤂	𐤃	Β	Β	Β	Β β	Б б	B	Ɫ Ᵽ	ⱦ b	B b
ג	𐤄	𐤅	Γ	Γ	Γ	Γ γ(g)	Г г(g)	C	Ɽ ⱥ	ⱨ c	C c
ד	𐤆	𐤇	Δ	Δ	Δ	Δ δ	Д д	D	ⱦ Ⱨ	ⱪ d	D d
ה	𐤈	𐤉	Ε	Ε	Ε	Ε ε (ē)	Е е	E	ⱨ Ⱪ	ⱬ e	E e
ו	𐤊	𐤋	Ζ	Ζ	Ζ↑		Ф ф	F	ⱪ Ⱬ	Ɱ f	F f
ז	𐤌	𐤍	Ζ	Ζ	Ζ↑	Ζ ζ (z)	З з	G	ⱬ Ɑ	Ɒ g	G g
ח	𐤎	𐤏	Η	Η	Η	Η η(u)		H	Ɱ Ɐ	Ⱳ h	H h
ט	𐤐	𐤑	Θ	Θ	Θ	Θ θ (t)	И и	I	Ɒ ⱱ	ⱴ ij	I i
ך	𐤒	𐤓	Κ	Κ	Κ	Κ κ	К к	K		ⱶ k	K k
ל	𐤔	𐤕	Λ	Λ	Λ	Λ λ	Л л	L	Ⱳ ⱳ	ⱸ l	L l
מ	𐤖	𐤗	Μ	Μ	Μ	Μ μ	М м	M	ⱴ Ⱶ	ⱺ m	M m
נ	𐤘	𐤙	Ν	Ν	Ν	Ν ν	Н н	N	ⱴ Ⱶ	ⱼ n	N n
ס	𐤛	𐤜	Ξ	Ξ	Ξ	Ξ ξ (s)	О о	O	ⱶ ⱷ	ⱼ o	O o
פ	𐤞	𐤟	Π	Π	Π	Π π	П п	P	ⱶ ⱷ	ⱼ p	P p
ץ	𐤠	𐤡	Ϟ	Ϟ	Ϟ		Q	Q		ⱼ q	Q q
ק	𐤢	𐤣	Ρ	Ρ	Ρ	Ρ ρ	Р р	R	ⱶ ⱷ	ⱼ r	R r
ש	𐤤	𐤥	Σ	Σ	Σ	Σ σς	С с	S	ⱶ ⱷ	ⱼ s	S s
ת	𐤨	𐤩	Τ	Τ	Τ	Τ τ	Т т	T	ⱶ ⱷ	ⱼ t	T t
			Υ			Υ υ	У у(u)	V	ⱶ ⱷ	ⱼ u	U u
						Φ φ(f)	В в			ⱼ v	V v
										ⱼ w	W w
			Χ	Χ		Χ χ(h)	Х х(h)	X		ⱼ x	X x
						Ψ ψ(s)		Y		ⱼ y	Y y
			Ω			Ω ω(ō)		Z		ⱼ z	Z z

The first column contains the Modern Hebrew script, which phonetically corresponds with the Early Semitic alphabets (columns 2-3). These and the alphabets of the next three columns contain a few letters which have not passed to the other alphabetic systems or have changed their phonetic values. These letters are drawn in smaller type in the upper part of the square in their alphabetical order.

Russian.—The following Russian letters have no exact equivalent in the Roman alphabet or they are placed in different alphabetic position. В, meaning V (between B and G, which in the Russian alphabetic order takes the place of C), Ёж, Ъ, and Ы, variants of I or V, Ц, Ч, Ш, Щ, Ъ, Ь, Э, Ю, Я, Ё, Ъ, Ы.

Modern Hebrew.—The Hebrew letters, K, M, N, P, and S have also final forms, drawn on the left.

N. Etruscan or Alpine A.s. and various Italic A.s. (Oscan, Umbrian, Siculan, Faliscan, and especially Lat.). The origin of the Runes, the 'national' writing of the Teutons, especially of the N. Germanic peoples, offers many difficult problems. The most probable theory is that recently suggested and already accepted by many eminent scholars, that the Runes were derived from a N. Etruscan A., and were invented in the 2nd or 1st cent. BC. There were many local and chronological varieties, the following being the most important: Early or Common Teutonic or Primitive Norse (used mainly from the 3rd to 8th cents. AD), the A.-S. or Anglian Runes (employed in England for about 5 cents.), and the Nordic or Scandinavian varieties (from about AD 800). The gradual displacement of the Runes by the Rom. character coincided with the introduction of Christianity and its increasing influence, but in some parts of Scandinavia the Runic scripts lingered on (in limited use, for charms, for instance) as late as the 16th cent. or even the 17th cent. The origin of the Ogham A.—employed by the Celtic pop. of the Brit. Isles, particularly in S. Ireland and Wales, Isle of Man, and Scotland—is still obscure. It seems to have been invented in the 4th cent. AD, and mainly used as a cryptic script. The variety which was employed in W. Scotland is now known as Pictish Oghams.

The oldest existing records written in the Lat. or Rom. A. date from the 7th cent. BC, but on the whole the Lat. inscriptions belonging to the 7th to 2nd cents. BC are relatively few in number. The earliest inscriptions run from right to left, or vertically in *boustrophedon* style. Only from the 1st cent. BC onwards do they become so numerous all over the world that they cannot be counted. The Romans adopted 21 of the original 26 Etruscan letters, and at the same time varied the symbols a little. Their early A., therefore, ran thus: A B C (having the sound *g* or *k*) D E F Z H I K L M N O P Q R S T V X. At a later time Z was dropped, but a new letter was invented (consisting in the addition of a bar to the lower end of C, thus converting it into G) to denote the voiced sound *g*, and was placed in the position previously occupied by *zeta*. In the 1st cent. BC the Gk letters Y and Z were adopted (for the transliteration of Gk sounds) and placed at the end of the A. Thus the classical Lat. A. became one of 23 letters. The only permanent additions of the Middle Ages were the signs J U W. J is *i* used as a consonant; U is a variant of V which has secured separate recognition, U being used for the vowel-sound *u* to distinguish it from the consonantal *v*, for which V is employed; and W is *oo*, or double *u* (UU—VV).

The Eng. A. is, strictly speaking, the adaptation of the Lat. A. to the A.-S. form of speech. (Also the other modern European A.s. with a few exceptions, are adaptations of the Lat. A. to Romance, Teutonic, Slavonic, and Finno-Ugric languages.) To the A.-S. A., however, 3 new letters were added, one of which,

for the sound *th*, was borrowed from the Runes. Later the influence of the Normans caused these to be discarded. The vowels of the Eng. A. are like those of the Lat. A., but the sounds which they represent are very different (see SPELLING). The 'Gothic' A., known as 'black letter,' a medieval variant of the Lat. A., employed in NW. Europe, including England, until the 16th cent., is still used in Germany. The modern Irish A. (known also as Gaelic or Celtic), consisting of 18 letters, 5 vowels and 13 consonants, is a development of the Insular hand of the Lat. A., which according to some scholars was already used in Ireland in the 6th cent.

The evolution of the A. and of some specimens of modern A.s. is illustrated in the diagram opposite.

See I. Taylor, *The Alphabet* (2 vols.), 1883; H. Jensen, *Die Schrift in Vergangenheit und Gegenwart*, 1935; J. G. Février, *Histoire de l'écriture*, 1948; G. R. Driver, *Semitic Writing*, 1948; L. Hogben, *From Cave Painting to Comic Strip*, 1949; I. J. Gelb, *A Study of Writing*, 1952; M. Cohen, *L'écriture*, 1953; A. C. Moorhouse, *The Triumph of Writing*, 1953; D. Dringer, *The Alphabet, A Key to the History of Mankind* (4th impression), 1953, and *The Hand-produced Book*, 1953; F. Denman, *The Shaping of our Alphabet*, 1955. See also bibliography to PALAEOGRAPHY and WRITING.

Alphege, St (954–1012), Eng. Benedictine monk and prelate. He joined the order at Deerhurst in Glos, and was afterwards abbot of a monastery near Bath. Bishop of Winchester, 985; Archbishop of Canterbury 1006. Martyred at Greenwich by the Danes, he was buried in Canterbury Cathedral. His feast is on 19 April.

Alpheus, see RUPHEA.

Alphonsine Tables, astronomical work compiled by a body of celebrated Arabian, Christian, and Jewish astronomers, working at Toledo in the reign of Alfonso X, the Wise, of Castile. They were completed in 1252, and first printed in 1483.

Alphonso, see ALFONSO.

Alphonsus, St, see LIGUORI.

Alphorn, see ALPENHORN.

Alpine Club, society of experienced climbers formed in 1857–8 to foster mountaineering, not only in the Alps, but throughout the world. It has been followed by many similar clubs in various countries. It laid the foundations of Alpine literature in 1859 with the pub. of *Peaks, Passes, and Glaciers*. In 1863 it began to pub. the *Alpine Journal* which now has an international reputation (No. 295 appeared in the centenary year, 1957). In consort with the Royal Geographical Society the A. C. has sponsored 9 Everest expeditions.

Alpine Orogeny, cycle of geological events which led to the formation of the Alps (q.v.) and of the other mt chains formed at the same time. The A. O., or Alpine period of mt building, reached its climax in the Miocene but may be said to have begun in late Mesozoic times, while it has not entirely ended at the present day. During the A. O. earth movements took

place which caused long strips of the crust of the earth to be folded and uplifted to form the mt chains of the Alps, the Apennines, the Carpathians, parts of the Atlas range in N. Africa and the prin. ranges of the Near and Middle E. which, together with the Himalaya, form the Asiatic continuation of the European Alps. Further E., movements of the same period are recorded in the mts of Burma, Malaya, and of Indonesia. The very existence of the Indonesian ls. arcs is in fact the result of Alpine uplift of the ocean bed. Alpine movements occurred also in New Zealand. The European and Asiatic parts of the Alpine chain follow to a large extent the basin of the Tethys Sea, a sea which during Mesozoic times was being filled with sediments. This sequence of marine sediments was subsequently elevated to form a large part of the Alpine mt chain. See also MOUNTAIN BUILDING PERIOD and GEOLOGY.

Alpine Plants are those which grow in high altitudes, as on mts which at a greater level bear perpetual snow. They are xerophytic plants, their conditions giving them a low degree of transpiration, and they exhibit most of the characteristics of Arctic plants. The flowers are more brightly coloured than those growing in lower regions, the roots are large, and the leaves frequently hairy, and often exist for long periods covered with snow; in themselves the plants are small and tufted. Most of the flowers are self-pollinated, owing to the scarcity of insects, though moths and butterflies are found at some high levels, e.g. the Alps, and vegetative reproduction is common. A. P. are generally shrubs and herbaceous plants. The most numerous of these are the various saxifrages, the edelweiss, rhododendron, campions, lady's mantle, violas, and primulas. There is naturally considerable variety among the flowers, as they live on damp or on rocky soil, and on damp soil such lower plants as mosses and liverworts abound. See H. S. Thompson, *Alpine Plants of Europe*, 1911; R. Farrer, *The English Rock Garden*, 1937; Sampson Clay, *The Present Day Rock Garden*, 1937.

Alpini, Prospero (Prosper Alpino) (1553-1616). Venetian botanist. b. Marostica. He studied at Padua, and became prof. of botany there. He did much valuable botanical research in Egypt. His chief works are *De Plantis Aegypti*, *De Medicina Aegyptiorum*, and *De Medicina Methodica*.

Alpinia is a subtropical genus of Zingiberaceae found in S. and E. Asia. *A. officinarum* yields Rhizomatis galangae, used as a medicine, and, in the E., in the place of ginger.

Alps (possibly derived from a Celtic word meaning 'high,' or connected with Lat. *altus*, white), massive mt range covering an area of over 80,000 sq. m., extending from the Mediterranean to the Danube, a distance of some 600 m. The width of the ranges varies from 80 to 150 m. It is the most extensive mt system in Europe, forming, in fact, its backbone. Its length is cut up by valleys in all directions, and many of its component

ranges run parallel, as in the Central A., or obliquely, as in the W. From very ancient times the div. of the A. has been threefold: the W. A., extending northward from the Mediterranean to Mont Blanc; the Central A., from Mont Blanc to the Brenner Pass; the E. A., from the Brenner Pass to the Hungarian plains.

I. The W. A. comprise the following prin. ranges: (1) The Maritime A., generally of no great height, but extremely broken and irregular. (2) The Cottian A., containing sev. peaks over 12,000 ft high. The small group of Oisans to the W. of this contains the Pic des Ecrins (13,462 ft). (3) The Graian A., generally higher than the Cottian, which attain in Mont Paradis a height of 13,300 ft. II. The Central A. are generally subdivided into a N. and a S. chain, running fairly parallel. They comprise many groups, of which the chief are the Bernese A. in the N. chain, and in the S. the Pennine, Lepontine, and Rhaetian A. It is here, in the neighbourhood of Mont Blanc, that the A. reach their greatest elevation and that the best-known peaks occur. In the Bernese A. we have Finsteraarhorn (14,026 ft), Jungfrau (13,670 ft), Mönch (13,468 ft), Eiger (13,042 ft), Schreckhorn (13,386 ft), and Wetterhorn (12,166 ft). The Pennine A. contain Mont Blanc (15,732 ft), Monte Rosa (15,217 ft), Weisshorn (14,770 ft), Breithorn (13,685 ft), and Matterhorn (Mont Cervin) (14,678 ft). The Rhaetian A. are at a lower level, though containing many peaks over 11,000 ft high. The Ortler A. to the E. of these are slightly higher, Ortlerspitze itself being 12,800 ft. III. Of the E. A. the prin. chains are: (1) the Noric A., with the height of Gross-Glockner; (2) the Carnic A.; and (3) the Julian A.

The extreme inequality of the A. renders them easy to cross. Even in the highest part, the W. end of the Central Div., passes are numerous, and 5 railway tunnels now render travel easy. These tunnels are the Mont Cenis, connecting France and Italy; the Simplon, connecting the valley of the Upper Rhône with Lake Maggiore; the St Gotthard, connecting Lake Luzern and Lake Maggiore; the Lötschberg tunnel, between Kandersteg and Goppenstein, which was opened in 1913; and the Aarberg tunnel, connecting Switzerland and Austria. There are passes over most of these mts, among the more notable being the 2 St Bernard passes and the Splügen.

The constitution of the A. is the result of much faulting and folding, mainly NE. and SW. Many upheavals have occurred at different periods, and remarkable examples of thrusts are common. The higher ridges consist chiefly of crystalline schists associated with granite. The summits rise considerably above the line of perpetual snow, and the forms of vegetable life vary with the altitude from that common to central Europe to that of the Arctic regions. The larger animals are becoming rare owing to the ravages of sportsmen, but the smaller fauna are numerous.

Glaciers occur chiefly in the Central A. They give rise to numerous rivs., of which the chief are the Rhine, Rhône, Po, and Danube. Their number is gradually decreasing, and must once have been very considerable.

The scenery of the A. is renowned throughout Europe and draws annually many tourists, who, before 1939, were gradually enriching the peasantry. The beauty of the lakes (such as Luzern, Geneva, Brienz, Thun, Zürich, Constance, Maggiore, Como, Garda) and the mt views, together with the excitement and pleasure of mt-climbing, combine as

The Alpine clubs all publish periodical journals. See Ball, *Alpine Guide* (3 vols.), 1863 on; Schlagintweit, *Untersuchungen über die physikalische Geographie und Geologie der Alpen*, Leipzig, 1850-4; Bonney, *The Alpine Regions of Switzerland and the Neighbouring Countries*, London, 1868; Tyndall, *Hours of Exercise in the Alps*, 1873, and *The Glaciers of the Alps*, London, 1896; Umlauf, *The Alps* (Eng. trans.), London, 1889; F. Heritsch, *The Nappe Theory in the Alps: Alpine Tectonics*, 1905-28 (trans. by P. G. H. Boswell, 1929); F. Muirhead and M. Monmarche, *The French Alps*, 1923; G. W. Young,



E.N.A.

THE NORTH WALL OF THE EIGER (LEFT), AND THE MÖNCH

attractions. Invalids may here seek repose and health in the sanatoria, such as Davos and St Moritz; tourists may contemplate the natural marvels or give themselves up to the Alpine sports. The A. indeed deserve their name of the playground of Europe.

During the period of the Second World War there was naturally an absence of foreign visitors and many of the largest Alpine hotels went out of business for the duration of the war. Again, owing to changes of fashion in travel some of the largest, even before the war, could not be made to pay. It was only by the summer of 1946 that all services began reopening. To these were added a service over the new Susten Pass post-road, which now links the valley of the Reuss at Wassen, in the canton of Uri with Meiringen in the Bernese Oberland. This fine motor road, a marvel of engineering, with a panorama of the finest Alpine scenery, is one of the most popular of the great Alpine routes. See also MOUNTAINEERING.

On High Hills: Memories of the Alps, 1927; G. R. de Beer, *Early Travellers in the Alps*, 1930; J. E. Tyler, *The Alpine Passes in the Middle Ages, 962-1250*, 1930; Leon W. Collet, *The Structure of the Alps* (2nd ed.), 1936; W. W. Hyde, *Roman Alpine Routes* (Amer. Philosophical Society), 1936; J. J. Schatz, *Alpine Wonderland* (introduction by Sir C. Schuster), 1936; R. L. G. Irving, *The Alps*, 1939; G. Rébuffat, *Starlight and Storm*, 1956.

Alps, Lunar, massive mt range on the moon exceeded in importance only by the Lunar Apennines. Its extent—in a gentle curve for about 180 m.—forms the NW. boundary of the Mare Ibrum. Its highest peak, Mont Blanc, rises about 12,000 ft. The smallest telescope will show the great valley cutting through the A., which is thus vividly described by Dr H. P. Wilkins, regarded as a good authority on lunar topography: 'It looks as though a gigantic chisel had been driven through the mts, and the valley is

supposed by some people to have been caused by a meteor ploughing its way ages ago.' See *Astronomy for Everyman*, 1955.

Alpujarras, Las (Moorish *al Busherat*, the grassland), mountainous dist. of Spain, lying to the S. of the Sierra Nevada (q.v.) in the prov. of Granada (q.v.). It has beautiful and fertile valleys, in which the Moors sought to retain their independence after the fall of Granada in 1492 (see *SPAIN, History*). The prin. vil. is Ugijar.

Alred, see **ALURED**.

Airuna, word etymologically connected with runes and used to denote a witch in anet times. Sometimes the word was applied to images used in the black art.

Ais (Ger. *Alsen*), Danish is. in Little Belt, Baltic Sea, off the coast of Slesvig, about 19 m. long and 3-12 m. broad, with an area of 120 sq. m., and a pop. of 37,910. Sønderburg is the chief tn. Ceded to Germany in 1864, this originally Dan. is. was restored to Denmark in 1920. In the Second World War it was occupied by the Germans. Since 1930 the is. has been connected with the mainland by a bridge across A. Sound.

Alsace-Lorraine (Ger. *Elsass-Lothringen*), imperial ter. (*Reichsland*) of Germany from the end of the Franco-Ger. War (q.v.) in 1871 until the treaty of Versailles (q.v.) in 1919. It consisted of the anet Fr. prov. of Alsace, and of Ger. Lorraine (q.v.). The dist. is now part of France, and forms the depts of Haut-Rhin and Bas-Rhin (Alsace) and Moselle (Lorraine) (qq.v.). The chief tns are Strasburg, Metz, and Colmar (qq.v.). Area 5605 sq. m.; pop. 1,987,000 (1954). From the earliest times it has been a disputed ter. Originally inhabited by the Gauls, after the Rom. conquest it became largely Germanised. It became part of the Frankish empire, and after the 10th cent. of the Ger. empire, till part of it was ceded to France in 1648 at the Peace of Westphalia. The remaining portion was seized by Louis XIV in 1681, and secured by the Peace of Ryswick in 1697. A few outlying dists. were secured by France after the 1789 revolution. Early in the Franco-Ger. war of 1870-1 the dist. fell into the hands of the Prussians, and was immediately reorganised. It was formally ceded by the treaty of Frankfurt, much against the wishes of the inhab. In 1872, when obliged to make choice of nationality, 160,000 elected to be French, of whom 50,000 returned to France. In 1911 a local parliament or diet was estab. for A.-L.

After the Franco-Ger. war of 1871 the deliverance of A.-L. from the Ger. yoke became an article of faith in the political creed of France. When the First World War broke out, the hope of regaining the lost provs. was reawakened in all its intensity, and even during the darkest days of 1917 when the issue of the war seemed in doubt, the passionate determination to settle the future of the provs. never wavered. When Moltke in 1871 insisted upon, and Bismarck, against his better judgment, acquiesced in, the annexation, the dominant idea in their minds was to secure a strategic frontier.

At the same time, Germany, probably unwittingly, also secured the largest deposit of iron ore in Europe and thereby in the ensuing 40 years built up her imposing fabric of prosperity and power. From the natural wealth of the ravished provs. Germany, in fact, derived that metallurgical ascendancy and the motive power for her industries upon which was founded no small part of her material progress, and, in consequence, her formidable naval and military strength. In actual figures, of the 2,800,000,000 tons of iron ore in all Germany before the First World War, Lorraine alone yielded some 2,000,000,000. Up to 1903 Germany had no need to import from abroad a single ton of ore, the supplies from Lorraine enabling her to maintain for over 3 decades an unrivalled industrial expansion. Without these resources Germany would, long before 1918, have exhausted her capacity for turning out the essential material of war. The Fr. people were by no means oblivious of these commercial advantages, but their ardent desire to recover the provs. was not primarily founded on the possibility of crippling the industrial power of Germany by depriving her traditional adversary of over 40,000,000 tons of ore a year. This transference of material resources was but the means to the accomplishment of the one permanent object—namely to secure a boundary which, for the sake of future generations, should put an end once and for all to the perpetual menace of a Ger. invasion. Hence, throughout the vicissitudes of the First World War, the allied diplomacy was unequivocal in its assertion that when the time came for *pari passu*, no lasting peace would be possible unless the restoration of A.-L. to France was made an indispensable condition.

Both on humanitarian and sentimental grounds the claims of France were indisputable, and it was from these grounds that the ardour of Fr. hopes during the 40 years after 1871 derived its impulse. But these same inspiring motives were to a certain extent subordinated, during the war, which, by its very magnitude, threw into bold relief the greater issue of Germany's bid for world dominance. The relatively local question had in fact become a major issue for the whole of Europe, and it was axiomatic in the common policy of the Allies that the restoration of European equilibrium was not to be attained without the transfer of the 'lost provinces' to France.

If, however, the reinstatement was imperative as the solution of a question of modern practical politics, much justification for Fr. claims could be advanced on historical grounds. The Ger. plea that A.-L. ought always to have been Ger. ter. because the provs. formerly belonged to the Holy Rom. and Germanic Empire, was untenable, the subsequent long connection between the 2 provs. and France having so far eliminated all Ger. influences as to reduce the plea to a mere medieval archaism. From the standpoint of practical politics, however, it is useless to go further back than 1815,

when the provs. on the l. b. of the Rhine were taken from France by the rest of Europe and given to Prussia with the object of checking Fr. aggrandisement. Cynicism prompts the retort that the war merely showed that the boot was on the other foot; but inasmuch as this transference had failed, by reason of the unsuspected and unscrupulous aggressiveness of Prussia, as a political measure of precaution to preserve the balance of power in Europe, it was recognised even before 1871 as an initial error. Yet the error was repeated in 1871, when the powers stood by while Germany, grown immeasurably in political stature since Waterloo, annexed, without the smallest pretext of adjusting the equilibrium of Europe, yet another considerable portion of her neighbour's ter., a portion embracing the most valuable Fr. iron-mines and most of her blast furnaces.

In the strategic concentration immediately before hostilities opened in the First World War, the Ger. Sixth Army of 5 corps under Prince Rupprecht of Bavaria was concentrated in Lorraine, E. of Metz. A detachment of *ersatz* (reserves) and *landwehr* troops was posted in the S. portion of Alsace. From this it was clear that an offensive in Alsace and Lorraine was intended as soon as possible. To disturb the Ger. concentration, the Fr. 7th Corps, stationed at Belfort, was ordered to advance towards Mülhausen. One brigade reached Mülhausen on 10 Aug. 1914, but was driven back in disorder. After this the French formed an army of Alsace and projected a second invasion. The army, moving on 15 Aug., occupied the Vosges passes and reached Mülhausen on the 19th. An army of Lorraine was also formed to watch Metz, and protect the flanks of the Fr. Second and Third Armies by driving the Germans behind the outer works of Metz. These objectives formed part of the Fr. plan for a general offensive on the whole W. front, but the plan lacked the axiomatic merit of simplicity. When the French had reached Saarburg, the Germans counter-attacked, drove the French from the northerly passes and out of all but a small part of S. Alsace. In the course of 1915 a stalemate along the whole front resulted, which in Alsace involved give-and-take fighting on the high ground round Münster and very severe fighting for the massif known as Hartmannswillerkopf. No definite issue was reached and, as on the rest of the front, trench warfare succeeded the war of movement.

The Treaty Settlement.—Under Article 51 of the treaty of Versailles A.-L. was restored to Fr. sovereignty as from the armistice of 11 Nov. 1918, and the provisions of the treaty establishing the delimitation of the frontiers before 1871 were restored. Free zones were estab. in the ports of Strasbourg and Kohl, in conformity with the navigation and railways clauses of the treaty, and due provision was made for reinstatement of inhab. in Fr. nationality.

The Fr. Gov. reintroduced the old depts Haut-Rhin, Bas-Rhin, and Moselle,

and pursued, generally, a policy of assimilation. French was introduced in the school curricula as a language of instruction, and in 1925 the gov. proposed to control the Rom. Catholic Church by substituting Fr. lay legislation for the still valid Ger. laws. This proposal was dropped but it strengthened a Ger. autonomist movement, and in 1926 the *Elsass-Lothringer Heimatbund*, or Home League of A.-L., was founded to promote political autonomy within the Fr. framework, an *Alsatian* diet with a separate administration, equal language rights, and Ger. schools. In 1939 the autonomist party proper, called the *Elsass-Lothringische Partei*, had a number of representatives in the Fr. Chamber of Deputies who did not conceal their pro-Ger. sympathies. Ger. Nazi propaganda, in spite of Hitler's solemn renunciation of A.-L., was also very active in the provs. before the outbreak of the Second World War. Sev. autonomist leaders in A.-L. were arrested after war broke out, in Oct. 1939, and one of them, Charles Roos, was executed for espionage. Before 1940 there were about 1,500,000 Ger.-speaking people in A.-L., and while there are many who know no French others are completely bi-lingual. German was the prevailing language of the local press, and literature was produced in German, in the local Ger. dialect, and in French.

A.-L. was an occupied prov. in the Second World War. In 1940 the Germans expelled tens of thousands of Frenchmen from Lorraine to make room for Germans from the dists. subjected to Brit. bombing, giving them the choice of going to unoccupied France or to Poland. The persecution of the churches was carried out with special severity in Alsace in 1941. Lessons in religion by priests and in private schools and divine service were forbidden. The theological faculty in Strasbourg Univ. was abolished, and the cathedral closed to divine service. Germanisation of A.-L. proceeded apace in 1942. A decree was issued conferring Ger. citizenship on Alsace-Lorrainers who were serving in the Wehrmacht or S.S., or who were recognised as Germans 'worthy of confidence.' Compulsory military service in the Ger. Army was introduced in Alsace on 20 Aug., and in Lorraine a week later for certain classes. Bürokel, the Ger. head of the civil administration in Lorraine, made strenuous efforts to Germanise the ter. Names of Fr. origin were suppressed and replaced by Ger. names and the use of the Fr. language was forbidden. But the Alsatians and Lorrainers resisted these attempts passionately and unanimously. Liberation came with the advance of the Amer. and Fr. forces in 1944-5. See further under WESTERN FRONT CAMPAIGNS IN THE SECOND WORLD WAR. See O. Lorenz and W. Scherer, *Geschichte des Elsasses*, 1886; R. Reuss, *Histoire d'Alsace* (22nd ed.), 1920; C. Spindler, *L'Alsace pendant la Guerre*, 1925.

Alsatia, cant name given to the dist. of Whitefriars, between the Thames and Fleet St, London, formerly used as a

sanctuary for debtors and criminals. The rights of sanctuary, enjoyed originally by the Carmelite friars here, were confirmed by James I's charter of 1608, and finally abolished in 1697. The name derives from Alsace, the 'debatable land' between France and Germany. The 17th cent. society of A. is brilliantly portrayed in Scott's *Fortunes of Nigel*.



T. Fall

ALSATIAN

Alsatian, large wolfhound, with stiffly erect ears and deep chest, so named because at one time it was used as a sheep-dog in Alsace. It is a hybrid of varieties of N. and S. Ger. sheep-dogs, and, being intelligent, amenable to discipline, and readily trained, is often used as a police dog and a guide for the blind. Its popularity outside Germany and France is of comparatively recent date, but though a favourite both as companion and watch-dog it is uncertain in temper; this, however, may result from improper feeding, lack of exercise or companionship, and absence of training or restraint. The height at the shoulder should be about 24 in., and 2 in. less in bitches. Colour may be varying shades of grey, brown, fawn, or black.

Alster, riv. of Schleswig-Holstein (q.v.), formed by confluence of 3 streams. Forms Great A. Lake near Hamburg, through which it flows into R. Elbe (q.v.).

Alston, or **Aldstone**, mkt tn in Cumberland, England, 29 m. ESE. of Carlisle. There are limestone quarries, and lead and copper are found in the vicinity. Coal is mined for lime-burning. Pop. 2500.

Astroemeria, genus of fleshy-rooted, S. Amer. herbs, family Amaryllidaceae, about 50 species. *A. aurantica* and *A. ligula* are grown in gardens for their flowers.

Alt, see **ALUTAY**.

Altai, see **ALTAY**.

Altair, Arab word used to denote a star brighter than the first magnitude in the constellation of the Eagle (Aquila) and about 16 light-years distant. The luminosity of A. is about 9 times greater than that of the sun, and it has a proper motion of 39" a cent.

Altamaha, riv. of Georgia formed by the junction of the Oconee and Ocmulgee and flowing into the A. Sound. It is 137 m. long, and is navigable for its

entire length for boats drawing 5 ft of water.

Altamira, Sp. vil. in the prov. of Santander, near Santillana del Mar (q.v.). It is famous for its caves, discovered in 1868, which contain relics of Palaeolithic times. One cave has a remarkable gallery of prehistoric rock-paintings representing animals. The animal most frequently depicted is the bison, but the wild horse, stag, and wild boar also appear. Some of the figures have been partly engraved, and in many places paintings and engravings have been superimposed upon earlier works. See **CAVE ART**.

Altamura, It. tn, in Apulia (q.v.), 28 m. SW. of Bari (q.v.). It has a 13th-cent. Romanesque cathedral. There are tumuli near by, and there are indications of an earlier city on the site of A. The dist. produces fruit, olives, and wine. Pop. 38,900.

Altar, table (usually of stone) on which sacrifice is offered. The use of A.s seems to have been almost universal in all times and among all nations. Early sacrificial hearths have been excavated in Palestine, of the primitive type described in the early parts of the O.T. Later there were 2 kinds of A. in use among the Jews, for burnt-offering and incense respectively. In anct. Greece and Rome A.s were low pedestals which stood inside the temple before the sacred image, or large erections in the open air, used for burnt sacrifice. A.s have always been places of refuge, and frequently places for the solemnisation of oaths. The earliest Christians had no fixed A.s, but they came into use with the cessation of persecution, and were erected over the relics of martyrs. The A. was nearly square in shape and placed in the axis of the church. In cathedrals, monastic churches, and some larger par. churches there are sev. A.s, the chief being the 'high A.' See also **BALDACHINO**. See G. Dix, *The Shape of the Liturgy*, 1945.

Altay, mountainous region in S. Siberia and Mongolia, stretching from NW. to SE. Its highest ridges (highest mt Belukha, 13,644 ft) are rocky and ice-covered. The eroded parts, of middle height, are rich in non-ferrous metals, particularly in the NW., and the valleys are fertile. A. is divided between the A. Kray and E. Kazakhstan oblast of the U.S.S.R., Mongolia, and Sinkiang (China).

Altay Kray, kray in S. Siberia, in the Altay Mts in SE. and Kuluuda (q.v.) Steppe in NW., traversed by the Ob'; gold, non-ferrous metals, and salt deposits. Area 101,000 sq. m.; pop. 2,500,000, Russians (since 17th cent.), Ukrainians, Germans (since 1941), and local Turkic tribes (see **GORNO-ALTAY AUTONOMOUS OBLAST**). Prin. tns, Barnaul, Biysk, Rubtsovsk. It is a rapidly developing agric. and industrial region (wheat, sunflowers, sugar-beet, dairy cattle; varied food, textile, engineering, and chemical industries). The area was annexed by Russia in the 18th cent.; first smelting plant built 1726; agric. colonisation since 19th cent. The Second World War and the Virgin Land campaign gave new impetus to its economic development.

Altazimuth, important astronomical instrument for ascertaining the altitude (q.v.) and azimuth (q.v.) of celestial objects, whence the name. It consists of a telescope revolving on a horizontal axis, to the side of which is rigidly attached a vertical graduated circle (read by optical aid) for ascertaining altitude. This apparatus is capable of moving above a horizontal circle, also read by microscopes, by which the azimuth of a heavenly body is determined. It is sometimes called a universal transit, but as a rule in large instruments its horizontal motion is small, being confined to a few degrees each side of the meridian. The A. invented by the Dan. astronomer, Oleas Römer, 1690, was capable of measuring all parts of the visible sky. All important observatories have this instrument, and Airy's A., erected at Greenwich in 1847, considered a fine instrument in its day, was replaced by a larger one in 1897.

Aldorf, vil., cap. of the canton of Uri, Switzerland, lies in a fruit-growing valley, on the St Gotthard railway line, surrounded by imposing mts. It is the traditional scene of the exploits of Wm Tell (q.v.), the liberator of Switzerland from the Austrian yoke. A monument to him stands in front of an old 5th-cent. tower. In the Tell Theatre (1899) Schiller's *Wilhelm Tell* is performed by A. residents in summer. Pop. 7000.

Aldorfer, Albrecht (c. 1480-1538), Bavarian painter, engraver, and architect, b. and d. Ratibon, of which he was the city architect and burgher. His most famous picture is the 'Battle of Arbelá,' at Munich, with an amazing panoramic background of lakes, mountains, and cities. Napoleon admired this painting greatly and hung it in his bath-room at St Cloud. A.'s engravings on wood and copper rank next to those of Dürer.

Altea, Sp. port in the prov. of Alicante, on the Mediterranean. It has a good harbour, and a coasting trade. Pop. 4200.

Altels, well-known summit of the Bernese Alps, Switzerland, 11,930 ft in height, and situated E. of the Gemmi Pass. Avalanches make the ascent very dangerous. First climbed in 1834 by a Swiss.

Alten, Carl August (1764-1840), Hanoverian and Brit. general. Served in Hanoverian army till its disbandment in 1802, when he came to England and entered the king's Ger. Legion, serving in Hanover and Copenhagen. He commanded in the Peninsular war, and at Quatre-Bras and Waterloo. When the king's Ger. Legion was disbanded he went to France, and later returned to Hanover, where he became a field marshal.

Altena, Ger. tn in the Land of N. Rhine-Westphalia (q.v.), 38 m. E. of Düsseldorf (q.v.). It has an anct castle and a notable art collection. Metal goods are manuf. Pop. 22,000.

Altenavia, see ALTONA.

Altenberg, Peter (1859-1919), Austrian writer, pseudonym of Richard Engländer, b. Vienna of Jewish parentage. He studied law and medicine, but led the life

of a literary Bohemian. He was a master of small impressionistic prose writings: monologues, dialogues, aphorisms, idylls, and prose poems. His works include *Wie ich es sehe*, 1896, *Märchen des Lebens*, 1908, *Neues Alles*, 1911, *Vita ipsa*, 1918, *Mein Lebensabend*, 1919. See E. Kraus, *Peter Altenberg*, 1919.

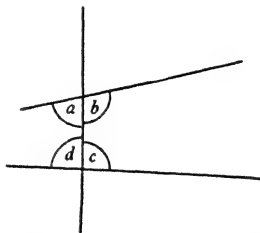
Altenburg, Ger. tn in the dist. of Leipzig, 25 m. S. of Leipzig (q.v.), on the R. Pleisse. It was once the cap. of Saxo-A. (q.v.). On an almost perpendicular porphyry rock stands the ducal castle (11th-18th cents.), the scene in 1455 of the abduction of the princes Albert the Bold (q.v.) and Ernest. There are textile, engineering, and tobacco industries, and there are lignite mines in the dist. Pop. 52,000.

Altenessen, see ESSEN.

Alter Ego, see EGO.

Alter Ego (Lat.) signifies 'another I.' The phrase was used to denote Sp. viceroys when exercising regal power, and was used at Naples when the crown prince was made vicar-general during the rebellion of 1820.

Alternate. In geometry if 2 straight lines are cut by a transversal (see fig.)



the angles *a* and *c* are said to be A.; similarly the angles *b* and *d* are A. In the special case of parallel (q.v.) lines cut by a transversal the A. angles are equal. In algebra and arithmetic those terms of a proportion are said to be A. which are separated from one another by another term; thus in the proportion 2 is to 4 as 8 is to 16, 2 and 8 are A. terms, as also 4 and 16.

Alternating Current. The electromotive force induced in a coil moving in a magnetic field is at any instant propor-

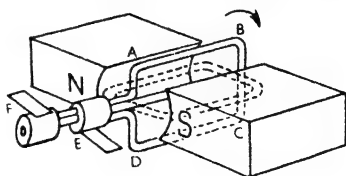


FIG. 1

tional to the rate of change of the number of magnetic lines of flux embraced by the coil. If the coil in Fig. 1 rotates in the

field N-S, it encloses a maximum number of lines in the position shown, but a small movement to one side or the other makes no difference: the rate of change is zero. As the coil rotates towards the position shown dotted, the number of lines enclosed sinks towards zero, but at a rate increasing towards a maximum. During a further 90 degrees rotation the number of lines increases again, but at a decreasing rate. After the half revolution the coil again faces the magnetic poles, but the coil itself is reversed. During this time the electromotive force, following the rate of change, rises from zero to a maximum and falls again to zero. It is clear that, as the (reversed) coil completes the rotation, the electromotive force goes through a negative maximum and regains zero, following during the revolution a curve such as Fig. 2. Obviously the positive

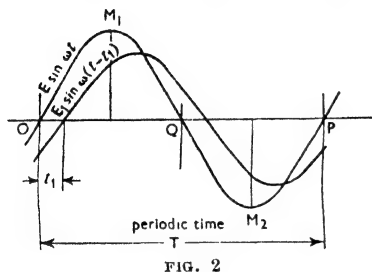


FIG. 2

half is symmetric with respect to the maximum, and the positive and negative halves are identical but reversed. The coil is assumed to rotate at constant angular speed ω , and time t is reckoned from the position shown in Fig. 1. At any moment t the coil plane is at an angle ωt (Fig. 3) to the initial position, and

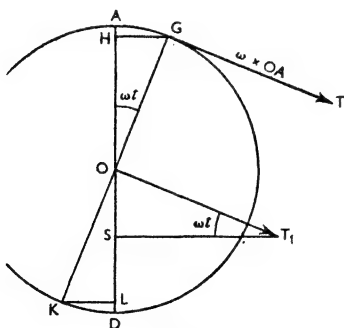


FIG. 3

encloses the lines through the area represented by HL. The number at any instant is thus proportional to $\cos \omega t$.

The linear velocity of the conductor AB is tangential to the circle and equals $\omega \times OA = GT = OT_1$. Its component at right angles to the field, OS, is proportional to $\omega \sin \omega t$. But this represents the velocity with which the number of lines through the coil varies, thus the electromotive force may be represented by the expression $E \sin \omega t$ where E is the maximum or 'peak' value, dependent on the field strength, shape and size of coil, and speed ω . An external (non-inductive) circuit connected to the slip rings (Fig. 1) will carry an A. C. $I \sin \omega t$, of 'periodic time' $T = 2\pi/\omega$, of frequency, or number of periods per sec., $f = 1/T = \omega/2\pi$, and of peak value I . The mean value of the current over a period is zero, as the positive and negative half-waves are equal. The mean of a half-wave is $2I/\pi$. The ampere value as measured on an ammeter is that producing as much heat in a wire in a given time, say T , as a direct current of A amperes: RA^2T . Dividing the period T into a large number n of equal parts, determining for each interval the value of $I^2 \sin^2 \omega t = I^2 \times \frac{1 - \cos 2\omega t}{2}$, adding up the n values, each multiplied by T/n , and multiplying by R , the total is $n \times \frac{T}{n} \times R \times \frac{1}{2} I^2$ since $\cos 2\omega t$ over a period consists of 2 positive and 2 negative equal half-waves. Thus $\frac{1}{2} RTI^2 = RA^2T$ or $A = I/\sqrt{2}$. This is the so-called root mean square (r.m.s.) value of an A. C., the value entering into most measurements. The form factor of a sine curve is the r.m.s. value \div the mean, or $\left(\frac{I}{\sqrt{2}}\right) / \frac{2I}{\pi} = 1.11$. The above mean, r.m.s. and form-factor values apply only to sine curves, and though A. C. and voltage do not always follow sine waves, it is the form aimed at in ordinary alternators, and most of A. C. theory is based on the assumption of sine wave form. This is also the case here. The curve $E \sin \omega t$ is plotted by dividing a circle of radius OE (Fig. 4) into equal

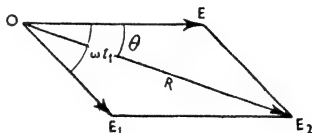


FIG. 4

parts and plotting the ordinates (see SINE CURVE OF). If a second coil rotates on the same axis at the same speed but following at an angle ωt_1 after the first, the electromotive force induced in the second coil is $E_1 \sin \omega(t - t_1)$. It is assumed that the second coil is of different size, hence E_1 . If now the second coil is connected to the same slip rings, the voltage across the brushes is at any instant the sum of the ordinates

of the sine curves (Fig. 2), $E \sin \omega t + E_1 \sin \omega(t-t_1)$

$$= E \sin \omega t + E_1 \sin \omega t \cos \omega t_1 - E_1 \cos \omega t \sin \omega t_1 \\ = (E + E_1 \cos \omega t_1) \sin \omega t - E_1 \sin \omega t_1 \cos \omega t, \\ \text{and putting } E + E_1 \cos \omega t_1 = R \cos \theta, \\ E_1 \sin \omega t_1 = R \sin \theta,$$

the sum is $R \sin(\omega t - \theta)$, i.e. another sine wave. It is easily shown analytically and verified by plotting that the sum is the sine wave obtained by rotating the diagonal OE_2 of the parallelogram formed by OE and OE_1 and plotting the ordinates of the circle in the usual way. The voltage $E_1 \sin \omega(t-t_1)$ passes its zero and maximum values t_1 sec. after $E \sin \omega t$; it is 'lagging' by an angle ωt_1 and the 'phase difference' is ωt_1 . The resultant is lagging by an angle θ . In A. C. diagrams voltage and current values may be represented by straight lines ('vectors') such as OE and OE_1 , drawn to a convenient scale and in their proper phase positions, it being always understood that these vectors rotate at the same speed and represent the sine waves that can be plotted from the circles. The 'vectors' may be treated like forces in Statics, added geometrically, split into components and combined into resultants. As an example, in a circuit consisting of a resistance R and inductance L carrying A. C. $I \sin \omega t$, the voltage (Fig. 5)

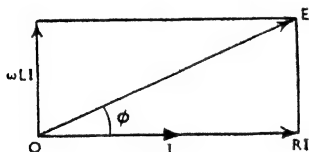


FIG. 5

across R is $RI \sin \omega t$ in phase with the current, across L it is $L \times$ (rate of change of current). It was shown above that rate of change of $\cos \omega t$ is proportional to $\omega \sin \omega t$, and as a sine curve is equal in shape to a cosine curve, the slope or rate of change of the sine curve is $\omega \cos \omega t$ (in the notation of the calculus, this is written $\frac{d}{dt}(\sin \omega t) = \omega \cos \omega t$, thus the voltage across L is $\omega LI \cos \omega t$. In the vector diagram RI is drawn horizontally, ωLI vertically, as $\cos \omega t$ 'leads' $\sin \omega t$ by 90 degrees. The resultant is $OE = I \sqrt{R^2 + \omega^2 L^2}$ leading the current by an angle ϕ , $\tan \phi = \omega L/R$. The quantity $\sqrt{R^2 + \omega^2 L^2}$ is the impedance Z , $\omega L = X$ the reactance. If the voltage is taken as the reference line, $E \sin \omega t$, the current is seen to be lagging, $I \sin(\omega t - \phi)$. The power at any instant is $E I \sin \omega t \sin(\omega t - \phi) = EI \frac{\cos \phi - \cos(2\omega t - \phi)}{2}$.

Over a period T the second term $\cos(2\omega t - \phi)$ vanishes and the power $P = \frac{1}{2} EI \cos \phi = VA \cos \phi$ where V and A are the r.m.s. values. The power factor is $\cos \phi = R/Z$. It is often convenient to

split all vectors in a diagram into horizontal and vertical components. For this purpose the prefix j is used to indicate that a quantity is turned anti-clockwise through 90°. In the example, Fig. 5, we may write $E = RI + jXI$, $Z = R + jX$. (See CIRCUIT, ELECTRIC.)

A. C. is now used almost universally for electric supply, owing to the facility with which voltage can be 'stepped up' from the generator through static transformers to high-voltage transmission lines, and again 'stepped down' for primary and secondary distribution. The A. C. induction motor is one of the simplest and most robust of machines. See CIRCUIT, ELECTRIC; DISTRIBUTION; ELECTRIC MACHINES; ELECTRIC SUPPLY; TRANSFORMERS; TRANSMISSION.

Alternation of Generations, biological phrase which indicates a curious form of the life-history of some plants and animals. Briefly, the organism has two distinct forms, one of which reproduces merely asexually by buds which become the alternate sexually reproducing individuals, whose fertilised eggs grow into asexually reproducing forms, thus completing the cycle. Either phase may be predominant in a particular species, and while the ability to reproduce by budding may be lost in the highest forms of life, it is believed that the processes of regeneration and wound-healing are limited forms of the same mechanism. In the vegetable kingdom the asexual plant which produces spores is called the *sporophyte*, the sexual plant which produces gametes (sexual cells) the *gametophyte* or *oöphyte*. In the ferns and horsetails the generation with which we are familiar is the sporophyte—in the fern the small brown bodies beneath the fronds are the asexual spores—and the sexual generation is not prominent; the gametophyte is a small green body growing on damp soil which gives rise to both male and female organs which produce again a fern as we know it. In the life-cycle of the mosses and liverworts the gametophyte generation is more conspicuous: the sporophyte is often seen rooted in the gametophyte as a brown stalk with a spore case at its apex. Among animals the Coelenterata exhibit A. of G. very clearly; here the ovum which has been fertilised produces a polyp capable of giving rise to buds, which in their turn give rise to jellyfish which contain sexual elements. See D. H. Scott, *Structural Botany*, Pt II, 1907, for comparisons of gametophyte and sporophyte generations; see also J. J. Steenstrup, *Om Forplantning og Udvikling gjennem vz-lende Generations Raekker*, 1842.

Alternator, electric machine generating alternating current (q.v.). See ELECTRIC MACHINES.

Althaea, genus of herbs, family Malvaceae, which are common in Europe. *A. rosea*, the hollyhock, found wild in China, grows in Brit. gardens; *A. officinalis*, the marsh mallow, grows in marshes.

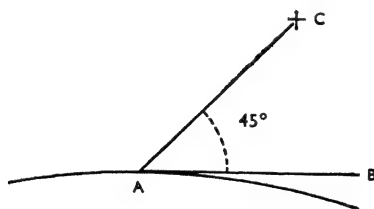
Althing, Parliament of Iceland, founded in 830. (Down to the end of the Commonwealth (1262) it wielded not only the

legislative power, but was also the highest court of justice, and at the same time the centre of the country's social life. After Iceland's submission to foreign rule the legislative power was largely abrogated, though never altogether renounced, and the judicial power ceased to be supreme. Under the weight of growing foreign misrule and the economic misery of the pop., the power and the prestige of the institution continually dwindled until nothing remained but the pathetic shadow of a court of the second instance, and finally a royal edict of 1800 abolished it. But the people clamoured for its re-estab. and by a decree of 1843 it was revived in the form of an advisory body. With the constitution of 1874 it acquired legislative power (subject to a royal veto) and full control of the country's finances. As now composed it consists of 52 members, 14 of whom sit in the Upper and 38 in the Lower House. Franchise is universal for those who have reached the age of 21, and those who have reached the age of 30 are eligible for election to the A.

Althorn, tenor (E flat) or baritone (B flat) saxhorn (q.v.), often used instead of a Fr. horn in military and brass bands.

Althorp, see SPENCER, 3rd EARL.

Altitude, astronomical term signifying the angle of elevation of a celestial body above the horizon. Thus if A be the position of the observer on the earth, AB the line of the horizon directly beneath the heavenly body, and C represents the planet or star, then the angle CAB is the A. of the star.



The A. of a star, as ascertained by a sextant, is used for calculating a ship's position at sea. See ALTAZIMUTH and AZIMUTH.

'Altmark', see NAVAL OPERATIONS IN SECOND WORLD WAR.

Altmühl, riv. of Germany, in Bavaria (q.v.), which rises near Rothenburg and flows generally SE. to the Danube (q.v.). It is connected by canal with the Regnitz, and so with the Main and Rhine (q.v.). The idea of this canal was originally conceived by Charlemagne. Length 103 m.

Alto (It., 'high'), highest pitch in the male voice; in women (contralto) and boys it is the lowest pitch of the voice. It originated in church music of the 16th cent., and as it was too difficult for boys to learn to sing A., and women according to the rule 'mulier taceat in ecclesia,'

were not allowed to sing in church choirs, it was assigned to men of high-pitched voices.

Alto Alentejo, prov. of central Portugal, containing the dists. of Évora and Portalegre (qq.v.). It is bordered on the N. by the Tagus (q.v.), on the E. by Spain, and on the SE. by the Guadiana (q.v.). It is hilly, and forested, but the riv. valleys are fertile. Some minerals are found. The prin. tn is Évora. Area 4880 sq. m. Pop. 394,800.

Alto Clef, clef with C on the middle line, is now used only for viola music, but formerly was employed for the alto voice. See CLEF.

Alto di Viola, It. term for the tenor violin, so called because it used to take the highest parts, while the *basso di viola* took the lowest in instrumental music.

Alto-rilievo (It., 'high relief'), term applied to that mode of sculpture in which objects are made to project from their background to the extent of more than one-half their thickness, so that some portions of the figures stand free. See BAS-RELIEF.

Alton: 1. Tn and urban dist. of Hants, England, 11½ m. from Basingstoke. Here Spenser lived for a time, and his cottage may be seen. The church dates from the early Norman period; a second nave and chancel are 15th cent. There are two breweries and sev. other industries. Pop. 8581.

2. City in Illinois, U.S.A., on Mississippi R., 4 m. above the mouth of the Missouri R., a trade and distributing centre; it is the seat of Shurtleff College and Monticello College, and the scene of the last Lincoln-Douglas debate and of the killing of Elijah Lovejoy. A lock and dam in the Mississippi are near by. Its manufs. are steel, clay, glass, lead, and brass products, tools, and chemicals. Pop. 32,550.

Alton Towers, Staffordshire pleasure resort, famous for its gardens. It was once a seat of the Earls of Shrewsbury. The gardens, which extend as far as the Churnet R., are adorned with statuary, grottoes, ornamental fountains, and temples. The house contains a picture gallery and armoury. It is now the subject of a Building Preservation Order.

Altona (ancient *Altenavia*), former Ger. tn on the Elbe (q.v.), now part of Hamburg (q.v.). It became Dan. in 1640, was burned by the Swedes in 1713, and in 1866 passed to Prussia. There are textile, chemical, and tobacco manufs.

Altoona, city in Blair co., Pennsylvania, U.S.A., 80 m. E. of Pittsburgh. It has large locomotive works, machine shops, and freight yards connected with the Pennsylvania Railroad, and manufs. textiles, clothing, electrical and motor-car parts, and metal products. Pop. 17,177.

Altötting, Ger. tn in the *Land* of Bavaria (q.v.), 48 m. E. of Munich (q.v.). It is a place of pilgrimage, with sev. notable churches: in one, the *Heilige Kapelle*, is a famous 13th-cent. black image of the Virgin; and in another Tilly (q.v.) is buried. Pop. 9000.

Altranstadt, Ger. vil. in the dist. of

Leipzig, 10 m. W. of Leipzig (q.v.). In a treaty with Charles XII (q.v.) of Sweden, signed here in 1708, Augustus II (q.v.) of Saxony agreed to resign the crown of Poland. Pop. 2000.

Altrincham, or Altringham, tn in Cheshire, England, on the Bridgewater Canal, 8 m. SW. of Manchester for which it raises fruit and vegetables. It has saw-mills and an iron foundry, manufs. yarns, and is one of the main centres of the machine tool industry. Pop. 41,000.

Altruism (Fr. *l'altruisme*, from It. *altrui*, of or to others), word coined by the Fr. positivist philosopher, Auguste Comte, and introduced by his followers into this country, where it has passed into general use. It is the antonym of *egoism*, and if the latter be defined briefly as 'each for himself,' A. stands for 'living for others.' The altruistic instinct is a social instinct or impulse, and is evidenced in kindness, veneration, and affection. It is not the exclusive possession of humanity, but manifested by many of the higher types of animals. It was this instinct or tendency in man that Comte wished to raise to a conscious principle, or an ethical ideal, which made the chief aim of human action that of seeking the welfare of others. Herbert Spencer in his *Data of Ethics* sought to show that in the course of social evolution egoism and A. would be conciliated.

Alum, crystallised double sulphate of aluminium and potassium, corresponding to the formula $Al_2(SO_4)_3.K_2SO_4.24H_2O$. The name is also used to designate a group of bodies of the same general structure, where the first sulphate is that of a trivalent metal like aluminium, chromium, or ferric iron, and the second that of a univalent metal like lithium, potassium, sodium, the ammonium radical, rubidium, caesium, thallium, or silver. The A. of the anctes (Lat. *alumen*) included a group of astringent substances of which potash A. and the naturally occurring aluminium sulphate appear to have been the chief. In the Middle Ages the manuf. was mainly in the hands of Italians, and a factory at Tolfa in the papal states continued producing up to a recent period. The raw material of the manuf. is A. rock, composed chiefly of alunite or A. stone. This is mixed with fuel in a furnace and after roasting exposed to the air. The mass is then lixiviated with hot water, the clear liquid drawn off and allowed to crystallise. A. is also made from A. shale, which is either allowed to decompose by exposure, or roasted. During the process, free sulphuric acid is formed, which acts upon the clay, producing aluminium sulphate, which is then dissolved out. Potassium sulphate or ammonium sulphate is added to the solution, when potash A. or ammonia A. is produced.

A. possesses a sweet astringent taste, and is used as a mordant in dyeing and in the manuf. of paper. Most A.s have an acid reaction, but, if an alkali is slowly added to the solution, a precipitate is formed which is re-dissolved on stirring. If this be done until no more precipitate

can be dissolved, the product is a neutral A., which is much used in dyeing, as it gives up alumina to the colouring matter.

Alum Root, or Heuchera americana, family Saxifragaceae. A. R. grows in N. America; it makes a valuable styptic. The term is also applied to the *Geranium maculatum*, of the family Geraniaceae. A. R. is used for ulcers.

Alum Shale, geological shales with high organic and sulphur content from which alum, $KAl(SO_4)_2.12H_2O$, may be obtained. Found in Britain, in the Lias and Carboniferous Systems, and in many other formations abroad.

Alum Stone, or Alunite, double compound of potassium sulphate and basic aluminium sulphate. Mixed with quartz, it composes the alum rock from which alum (q.v.) is obtained.

Aluminium (written and pronounced in Canada and U.S.A. 'aluminum'), metallic chemical element, symbol Al, atomic number 13, atomic weight 26.97. The oxide alumina (Al_2O_3) occurs in combination with silica in clays and felspar of all kinds, and is therefore widely distributed. The oxide is found uncombined in bauxite, corundum, emery, ruby, amethyst, sapphire, and topaz, the different colours being due to the presence of oxides of iron, cobalt, or chromium. Alumina was supposed to be an oxide long before separation into its elements was actually accomplished. A. was first discovered by Sir Humphry Davy in 1807 and first produced in 1827 by Oersted (q.v.), who fused potassium with the anhydrous chloride of A. in a closed crucible, obtaining the metal in the form of a grey powder. Afterwards Wöhler improved this method and succeeded in procuring the metal in a purer form in fused globules and in determining its sp. gr. In 1854 Deville tried the same process, but replaced the potassium by sodium, and the 'silver made from clay' of the Paris exhibition of 1855 drew much attention to the question of its economical production. The method used at the present day is the electrolysis of alumina. An iron pot, lined with carbon is charged with cryolite and heated to about 800° C. by the electric current. For the electrolysis a bundle of carbon rods is used as the anode, whilst the pot itself forms the cathode. The oxygen liberated combines with the carbon of the anode to form carbon dioxide, whilst the A. falls to the bottom of the vessel. More alumina is added and the process continued, the molten metal being drawn off from time to time.

A. is a tin-white metal which is malleable and non-magnetic, has a specific heat of .222°, a sp. gr. of from 2.70, a coefficient of expansion of .0000238, and melts at 658° C. It is about as hard as silver under ordinary circumstances, but becomes harder on rolling. If pure, it does not oxidise easily on exposure to the air at ordinary temps., is soluble in hydrochloric acid, and forms numerous useful alloys. The properties which make A. such a valuable metal

are its lightness, ease of working, non-poisonous qualities, and the fact that it is not affected by air. It is used for making cooking utensils, electric conductors, motor-car parts, and, in fact, for any purpose where saving in weight is a great consideration. The bulk of the metal is used in alloyed rather than pure form. Alloyed with a small percentage of magnesium, its hardness and toughness are considerably increased without making any material difference in its weight. See also DURALUMIN. A. is used in the Thermit process for the extraction of high melting metals from their oxides. A. oxide is used in the manuf. of refractory bricks and as an adsorption filter in chromatography. A. hydroxide is used as a mordant in dyeing and A. chloride as a catalyst in organic reactions, e.g. Friedel-Craft.

Alundel Furnace, system of cylindrical furnaces used for the reduction of mercurial ores. Retorts of glass, called Alundels, collect the condensed vapour.

Alunite, see ALUM STONE.

Alunno, Niccolò, see FOLIGNO, NICCOLO DA.

Alunogen, aluminium rock with the formula $\text{Al}_2\text{O}_3\cdot\text{SO}_3\cdot 18\text{H}_2\text{O}$. It is monoclinc, has a sp. gr. of 1.7 and a hardness of 1.5-2.0.

Alured, Alred, or Alfred, of Beverley (fl. 1140), Eng. chronicler and historian, and treasurer of the church of Beverley. He wrote a hist. of Britain up to 1129.

Aluta, Oltu, or Alt, trib. of the Danube which rises in the Carpathian Mts, flows through Transylvania and Rumania, and enters the Danube near Nikopol. The total length is 348 m.

Alva, or Alba, Fernando Alvarez de Toledo, Duke of (1508-83), Sp. soldier, descended from one of Spain's noblest families. He fought with distinction in Germany and Italy in the campaigns of Charles V. In 1567 Philip II appointed him governor of the Netherlands. It was a mistaken decision, for the Netherlands were already on the brink of revolt, their grievances being partly religious, but also constitutional and economic. Judicious diplomacy might have saved the situation, but A. saw the problem largely in terms of a military mutiny, and proceeded to try and deal with any opposition solely by armed force. His economic policy, with its crushing burden of taxation, had almost destroyed Netherland commerce by the time it was dropped. By 1572 A. asked for his own recall, his defeat apparent, and Requesens replaced him in 1573. In 1580 he undertook the submission of Portugal for Philip.

Alva, burgh in Clackmannanshire, Scotland, at foot of Ochils, 7 m. N.E. of Stirling. Near by are the picturesque A. and Silver Glens, and Cochrane Park. A. House is the seat of the Johnstones. Textiles, printing, and canning are the prin. industries. Pop. (burgh) 4107; (par.) 5120.

Alvarado, Juan Bautista, Californian who raised an insurrection against the Mexican Gov. in California and defeated the Mexicans in the decisive battle of

San Buenaventura. From 1836 to 1838 he took the revolutionary title of governor, and from 1838 to 1842 was officially recognised by the Mexican Gov.

Alvarado, Pedro de (c. 1495-1541), Sp. explorer and adventurer, b. Badajoz. His first command was in the Cuban expedition to Yucatan in 1518, and he served under Cortés in the conquest of Mexico. In 1523 he was sent to subdue Guatemala, and was later appointed governor by Charles V. He became governor of Honduras in 1537. In 1541 he was killed by Indians near Guadalajara, Mexico.

Alvares, Fernam (1540-95?), Portuguese poet, b. India. He was leader of 2 expeditions to the Coromandel coast. The most remarkable of his works is his *Lusitania Transformada*, in which can be noted the first traits of exoticism in the Portuguese novel.

Alvarez, Francisco (d. 1540), Portuguese traveller, b. Coimbra in the latter part of the 15th cent. He was one of those sent by King Emanuel of Portugal on an expedition to Abyssinia in 1515, and on his return to Lisbon, 1527, he wrote an account of his travels. This work, a copy of which is in the Brit. Museum, is remarkable for its simplicity and frankness.

Alvarez, Don José (1768-1827), eminent Sp. sculptor, b. India. He first worked with his father, a stonemason, and obtained admission into the Academy of Granada, 1788. He afterwards became a member of the Academy of Cordova, and a student of the Academy of San Fernando, Madrid. In 1799 he received a pension from Charles IV to study at Paris and Rome, and his statue of Ganymede, in 1804, gained for him the reputation of the greatest of contemporary sculptors. He was appointed prin. sculptor to the King of Spain, 1825. He also modelled portrait busts of Ferdinand VII, Rossini, and the Duchess of Alba. A group representing the 'Defence of Saragossa' and a group of 'Antiochus and Memnon' are 2 of his chief works.

Alvarez de Cienfuegos, Nicasio (1764-1809), Sp. playwright and poet, b. Madrid. Of his tragedies the most famous are *Pitaco* and *Loraida*. His poems were collected in *Obras poéticas* (2 vols., 1816). He was a member of the Sp. Academy.

Alveary: 1. A bee-hive.

2. The outer canal of the ear, *meatus externus*.

Alvensleben, Konstantin von (1809-92), distinguished Prussian general, served in the Dan. war. He commanded in the Franco-Prussian war and won high distinction at Orleans and Le Mans.

Alverstone, Richard Everard Webster, Viscount (1842-1915), politician and lawyer, educ. Charterhouse and Trinity College, Cambridge. He was called to the Bar in 1868, and became Q.C. 10 years later. In 1885 he became attorney-general in the Conservative gov., though he was not a member of Parliament, and had not held the office of solicitor-general. He then entered the House of Commons as member for

Launceston. He led the case as counsel for *The Times* against the Irish party before the Parnell Commission in 1889; he was Brit. representative in the Berlin Sea arbitration in 1893; and leading counsel in the Venezuela arbitration in 1899. In May 1900 he became master of the rolls—a position previously held by Sir Nathaniel Lindley—and was raised to the peerage. In Oct. of same year he succeeded Lord Russell of Killowen as lord chief justice; and in 1903 he was one of the 3 arbitrators on the Alaska Boundary question. A. was made a viscount in 1913.

Alvin, Louis Joseph (1806-87), Belgian writer and librarian of Brussels library, b. Cambrai. Among his dramas are *Sardanapale*, 1834, a tragedy, and *Le Folliculaire anonyme*, 1835, a comedy. He also wrote *Souvenirs de ma vie littéraire*, 1843. *Les Récontemplations* (a reply to Victor Hugo's work, 1856), and *Les Commencements de la gravure aux Pays-Bas*, 1857-9.

Alvinczy, Nicolas, Baron of (1735-1810), Austrian commander, b. Transylvania. He distinguished himself in the Seven Years War, and fought against the Turks in 1789. He was Commander-in-Chief of the Austrian Army against Napoleon, but was defeated at Arcola (1796) and at Rivoli (1797), and lost Mantua. He was made governor of Hungary, and field marshal in 1808.

Alwar, city of former A. state, now merged in Rajasthan state, India. The city palace contains an outstanding library of Persian and Sanskrit MSS.

Alwyn, William (1905-), musical composer, b. Northampton, studied at the Royal Academy of Music in London, where he was appointed prof. of composition in 1927. His music includes orchestral and chamber works, and he has been particularly successful with music for numerous films.

Alyattes, King of Lydia (c. 610-560 bc), estab. the Lydian empire. He made war against Miletus and against the Medes. At the Halys, where hostilities were interrupted by the occurrence of an eclipse of the sun, peace was concluded with Media, and the riv. was made the boundary between the 2 kingdoms. A. greatly extended his empire before his death. His tomb is still in existence, but has been plundered by excavators. He was succeeded by Croesus.

Allyn, N. Wales, see ALLEN.

Alyssum (from Gk *lyssa*, madness, and *a*, privative, as it was reputed to cure madness), a genus of 80 species of herbs, family Cruciferae, of which the Mediterranean perennial, *A. saxatile*, and its varieties are chiefly grown in gardens.

Alyth, burgh in E. Perthshire, Scotland, on Burn of A., 20 m. NE. of Perth. It has jute manufs. To the NW. lies the forest of A. Pop. 2072.

Alzey, Ger. tn in the Land of Rhineland-Palatinate (q.v.), 18 m. SSW. of Mainz (q.v.). It has a trade in agric. produce and wine. Pop. 10,000.

Amadavat, or **Avadavat**, *Estrilda amadava*, small singing bird which is to be found in the Malay Archipelago, about

5 in. long, carmine coloured, with the upper parts brownish grey and wings spotted white. Belongs to the family Ploceidae.

Amadeo, Giovanni Antonio (1447-1522). It. sculptor and architect, b. Pavia. In collaboration with others, he decorated the Certosa at Pavia. His monument of Bartolommeo Colleoni, a Venetian general, with its fine bas-reliefs and statue of the commander, in Bergamo, is one of the masterpieces of Renaissance sculpture. He also took part in the sculpture of the great octagonal dome of the cathedral of Milan. See Lübke, *History of Sculpture*, 1878.

Amadeus, name of 9 counts and dukes of Savoy:

Amadeus I. (d. 1078), son of Adelaide, Marchioness of Susa, and of Umberto I. Count of Maurienne in Savoy, called the White-handed. After his father's death he governed conjointly with his mother the states of Susa and Maurienne. This made him master of the great pass over the Alps into Italy, by Mont Cenis, from which much of the subsequent importance of his family was derived.

Amadeus II (reigned 1103-48), succeeded his father, Umberto II, Count of Maurienne. As a reward for his loyalty the emperor Henry V gave him the title of Count of Savoy, and vicar perpetual of the empire. A. also took the title of Marquess of Turin. A. accompanied Louis VII of France to the Holy Land, distinguished himself at the siege of Damascus, and relieved Acre, which was besieged by the Turks.

Amadeus III (reigned 1233-46) succeeded his father Thomas, as Count of Savoy, and his brother inherited Piedmont. He conquered the Chablais and the Lower Valais, and sent troops over the Little St Bernard to subjugate the valley of Aosta.

Amadeus IV (reigned 1285-1323), called 'the Great,' succeeded his uncle as Count of Savoy. By his marriage with Sybilla, Countess of Bugey and Bresse, these dists. of anc. Burgundy were united to his states, and he succeeded in otherwise extending his dominions. A. afterwards embarked for the E. where he helped to defend Rhodes against the Turks in 1315.

Amadeus V (reigned 1329-42) succeeded his brother Edward as Count of Savoy, and continued the war against the Dauphin of Vienne.

Amadeus VI (reigned 1343-83), called the Green Count, son and successor of the preceding. In 1349 Humbert, last dauphin of Vienne, gave up his title and principality to Charles, grandson of Philip of Valois, and retired into a Dominican monastery. A. was angered at this cession, which gave him a much more formidable neighbour than he had before, and a war ensued, in which A. defeated the French in 1354. A treaty was concluded at Paris the following year, by which the Count of Savoy gave up to France the dists. he possessed in Dauphiny beyond the R.s Rhone and Guiers; and he, on his part, was acknowledged

undisputed sovereign of Faucigny and the country of Gex, as well as suzerain lord over the counts of Genevois, all of which titles had been till then subjects of contention between the counts of Savoy and the dauphins of Vienne. A. also forced the Marquess of Saluzzo to pay him homage, and thus extended his rule on the It. side of the Alps. A.'s alliance was sought by the prin. sovereigns of his time. The Venetians and the Genoese had long quarrelled about the possession of the is. of Tencos, in the Aegean Sea, but at last agreed to give full possession to the Count of Savoy. Later Pope Clement VII persuaded him first to accompany Louis, Duke of Anjou, on his expedition to Naples, and there A. went in 1382 and shared in the first successes of Louis, who conquered the Abruzzi and Apulia.

Amadeus VII (reigned 1383-91), called the Red Count, succeeded his father, A. VI. He made the important acquisition of the county of Nice in 1388.

Amadeus VIII (reigned 1391-1439), son and successor of the preceding, was created first Duke of Savoy in 1416 by the Emperor Sigismund, who declared the court of the duchy to be independent of the imperial chamber. A. waged war against Filippo Maria Visconti, Duke of Milan, and took Verelli, which he united to his dominions. He also annexed to them the country of Genevois, having purchased the rights of the various claimants after the extinction of the male line. Thus the whole of Savoy was finally united under one sovereign. He was also prince of Piedmont, baron of Vaud, lord of Nizza, Mondovi, and Valenza, duke of Aosta, etc. A. gave his subjects a code of laws called 'Statuta Sabaudiae.' After 43 years' reign, he retired in 1434 to the hermitage of Ripaille, on Lake Geneva, entrusting the administration of his states to his son, Louis. For 5 years he lived at Ripaille, and here he mediated the Peace of Arras between France and England. The council assembled at Basel, having deposed Eugenius IV in 1439, elected A. anti-pope as Felix V. At the same time he definitely abdicated his temporal sovereignty to his son Louis. France, England, Spain, Germany, and Lombardy acknowledged him as pope, whilst the rest of Italy and the Venetians supported Eugenius, who continued to reside at Rome. The schism lasted 9 years; but when Eugenius d., the cardinals at Rome elected Nicholas V, and Felix himself proposed to renounce his rights to Nicholas, thus terminating the scandal in the Church. He d. at Geneva in 1451.

Amadeus IX (reigned 1465-72), Duke of Savoy, succeeded his father, Louis. He was called the Pious, because of his charity to the poor.

Amadeus, salt lake (area 340 sq. m.) of N. Ter., Australia, surrounded by mts and desert country. It was discovered in 1872 by Ernest Giles.

Amador de los Rios, Don José (1818-1878), Sp. writer, b. Bacna. His greatest work is a *Critical History of Spanish*

Literature, 1861-5. He wrote, besides works on Sp. art, a *History of the Jews in Spain and Portugal*, 1861, and a *History of the Town and Court of Madrid*. He was prof. of literature at the Madrid Univ. and a member of the Academy.

Amadou (Old Provençal *amadou*, lover) (*Fomes fomentarius*), is a fungus which grows on old trees, and is used for stopping haemorrhages. Boiled in strong saltpetre it forms the Ger. tinder of tobaccoconists.

Amagasaki, seaport and industrial city of Hyogoken, Japan, situated on the Bay of Osaka. It has chemical and metallurgical plants, engineering works, and textile mills, and also produces glass, pottery, and beer. Metalwork, drugs, dyes, pottery, and woodwork are exported. It has a pop. of about 350,000.

Amager, is. of Denmark, in the Sound, separated from Zealand by Copenhagen harbour. Christianshavn, on the N. end, forms part of Copenhagen. The is. is flat and fertile and has shipping and gardening industries. Area 25 sq. m.: pop. 174,820.

Amalaric (c. 502-31), Visigoth king of Spain, was the son of Alaric II and grandson of Theodoric II. He was only 5 years old when his father was killed in 507, but he was proclaimed king when he came of age. He married Clotilda, daughter of Clovis, king of the Franks, but the marriage led to religious disputes and a war with Childebert, King of Paris, the brother of Clotilda. The Spaniards were defeated in 531, when A. was killed.

Amaldar, name used to designate the governor of a prov. under the Muslim rule in India.

Amalekites, anet tribe in S. Palestine, apparently connected with the Edomites, and including the Kenites, and frequently mentioned in the O.T. as foes of the Israelites. The references are disconnected and confused. The A. harried the Israelite rear as they entered Canaan from Egypt, for which their extermination was promised. They were defeated by Joshua, Saul, David, and the Simeonites. The traditional hostility still appears in Esther.

Amalfi, It. seaport in Campania (q.v.), 7 m. ESE. of Salerno (q.v.). It is on the NW. shore of the Gulf of Salerno, on the Tyrrhenian Sea. In the 10th cent. it was one of the prin. ports in Italy. It was reduced by King Roger II (q.v.) of Sicily in 1131, and was later taken by Pisa, after which it rapidly declined. At the height of its power it had a pop. of over 50,000. It was finally ruined by a great flood in 1343, but its maritime code of law, the *Tanole Amalfitane*, was recognised in the Mediterranean until the second half of the 16th cent. It has a fine archiepiscopal cathedral (partly 10th cent., but much restored), and many other medieval buildings. There is a growing tourist traffic. Pop. 6500.

Amalgam, mixture or compound of one or more metals with mercury. A.s are usually obtained by direct union or by placing the metals with mercury into dilute acid. Those containing a large proportion of mercury are in a liquid form,

but if there is a small proportion of mercury the A. is frequently found to crystallise. Tin A. is used for backing mirrors; tin and zinc A.s are used for coating the rubbers of electrical machines; gold and silver A.s are used for gilding purposes; and an A. consisting of gold, silver, copper, tin, and mercury, in varying proportions, is used for stopping teeth.

Amalgamation, process of uniting or alloying a metal with mercury. It is by A. that gold and silver are extracted from the rocks in which they occur. A. processes cause the metals to combine with the mercury to form an amalgam.

Amalia, Anna, Duchess of Saxe-Weimar-Eisenach (1739-1807), b. Wolfenbüttel, the daughter of the Duke of Brunswick - Wolfenbüttel. She married Duke Ernest Augustus of Saxe-Weimar-Eisenach, and at his death in 1758 became regent for 17 years for her son, Charles Augustus, in whom she and Wieland, his tutor, fostered a love of art and literature. She was distinguished for her benevolent rule, and especially for her patronage of letters and learning. Weimar became the literary centre of Germany, and the court was visited by Goethe, Herder, and Schiller. See life by F. A. Gerard, 1902.

Amaleto, Pomponio (1505-c. 1588), b. San Vito, Friuli, It. painter of the Venetian school, a pupil of Pordenone. His prin. works are the frescoes in the castle, and in the church of Santa Maria at San Vito, and in the church of San Francesco, Udine.

Amalthæa: 1. Nurse of the infant Zeus, represented as a goat, from which was taken the *cornu copiae* (horn of plenty), which automatically filled itself with whatever its possessor desired.

2. The sibyl who brought Tarquin the 9 books containing Rome's destiny.

Amara, or **Albana**, one of 'the rivs. of Damascus' (2 Kings v), now the Barada, the Gk Chrysorrhoas.

Amara, vil. in Iowa, U.S.A., 20 m. SW. of Cedar Rapids, oldest of 7 vils. owned by Amara Society—'Community of True Inspiration.' The members of the society, founded in SW. Germany about 1715 in revolt against Lutheran dogmatism, moved in 1855 to A., which has become noted for craftsmanship in furniture and in wool textiles. Profits of the members' labours are distributed on an equal basis. Pop. 200. See Bertha M. Shambaugh, *Amara, the Community of True Inspiration*, 1908.

Amanita, family Agaricaceae, genus of Toadstool fungi, of which *A. phalloides*, Death Cap, is the most poisonous fungus known. *A. muscaria*, Fly Agaric, is also poisonous; but *A. citrina*, False Death Cap, *A. rubescens*, The Blusher, and *A. pantherina*, are sometimes eaten.

Amanullah Khan (1892-), ex-King of Afghanistan, third son of Habibullah Khan, on whose assassination he became amir in 1919. He adopted the title of king instead of amir in 1926, and his second wife, Surlyyeh, a Damascus woman, whom he married in 1914, became

queen consort, her official style being the Shah Khanum. Made war on Brit. forces in 1918-19. In 1928 made an extensive tour of Europe with Queen Surlyyeh to study W. institutions, but the outcome of his reformative zeal was disastrous and he lost his throne (see also AFGHANISTAN).

Amapala, main port on Pacific coast of Honduras, situated on Tigre Is. in Fonseca Bay. Its roadstead is deep enough for the largest vessels to lie within a few yards of shore. A. has a small airport, and timber, coffee, hides, and live-stock are exported. Pop. 2701.

Amapala Gulf, see FONSECA.

Amaranthus, or **Amaranth**, genus of the family Amaranthaceae. It is found in tropical and temperate climates. *A. caudatus*, Love-les-bleeding, and *A. hypochondriacus*, Prince's Feather, are grown as hardy annuals in gardens.

Amarapura, former cap. of Burma, on R. Irawadi, 6 m. NE. of Ava. Founded in 1783, it suffered from fire in 1810, and from earthquake in 1839. In 1860 Mandalay became the cap. and A. now remains a small tn. Prin. industry is silk weaving. 10 m. SW. of Mandalay, A. is connected with it by road and rail.

Amarasimha, Hindu poet and lexicographer, Buddhist, author of *Amarakosa* ('the vocabulary of Amara'), written in verse. This lexicon became very popular in India, and about 50 commentaries on it are extant. As A. quotes Kālidāsa (Hindu poet of the 5th cent. AD) he must have lived in the 6th or 7th cent.

Amargosa Desert, see DEATH VALLEY.

Amari, Michele (1806-89), It. historian, orientalist, and politician, b. Palermo. His most famous work, *La Guerra del Vespro Siciliano* (1841), was prohibited, and he fled to France, where he studied Arabic and modern Greek. During the revolution of 1848 he returned to Italy, and was made vice-president of the committee of war in Sicily, later visiting France and England on diplomatic missions. He remained in Paris till 1859, when he again returned to Italy to fight under Garibaldi. He was minister of public instruction, 1862-4, and prof. of Arabic at Pisa and Florence till 1878, when he went to Rome.

Amarna, see TELL EL AMARNA.

Amaru, José Gabriel Condorcanqui (1742-81), a revolutionary of Peru, and known as the 'last of the Incas.' He was leader of the opposition party to the Spaniards, but suffered defeat, and he and his house were put to death with extreme cruelty.

Amaryllidaceae, family of monocotyledonous plants which differ from the Liliaceae in having an inferior ovary. They grow mostly in tropical Asia, Africa, and Brazil, but some are European. The perianth leaves are in 2 whorls of 3 joined, the stamens are the same, the ovary is trilobular and inferior; many of the plants have a well-developed corona. Genera include *Agave*, *Alstroemeria*, *Amaryllis*, *Crinum*, *Galanthus*, *Leucojum*, *Narcissus*, *Nerine*, *Sternbergia*, *Vallota*, etc.

Amaryllis, genus of Amaryllidaceae.

(q.v.), so called from Virgil's shepherdess of that name. See *BELLADONNA LILY*.

Amasa, son of the Ishmaelite Ithra and of Abigail, sister of David, commanded Absalom's army; after defeat by Joab he submitted to David and replaced Joab as chief commander. Joab treacherously slew him at 'the great stone of Gideon.' See 2 Sam. xvii and xx.

Amasis I, or **Ahmes** (c. 1580-1558 BC), first Pharaoh of the 18th dynasty. He expelled the Hyksos from Egypt and began conquests in Palestine.

Amasis II (568-525 BC), fifth Pharaoh of the 26th dynasty, an Egyptian general who seized the throne from Apries (q.v.); he founded Naukratis (q.v.), conquered Cyprus, and maintained close relations with the Gk world.

Amasya, ancient town and vilayet of Asiatic Turkey, in valley of Yeshil-Irmak. Formerly court of kings of Pontus. Exports silk and salt. Pop. (vilayet) 163,000; (town) 13,000.

Amateur (from Lat. *amare*, to love), one who follows study or art or sport for love and not for gain. With the rise of professionalism in all sports the word has come to be used to distinguish the A. player from the professional. Monetary considerations form the dividing line between A. and professional in athletics, boxing, football, golf, tennis, running, for example, but the rules of the governing bodies as to the acceptance of fees and expenses vary (see separate articles).

Amati, name of a family of It. violin makers and the founders of the Cremona school. Their instruments are now esteemed of priceless value. Andrea, the eldest, was b. c. 1520 and d. after 1611. According to Féris he was probably a pupil of one of the master violin-makers of Brescia—Gaspar da Salò or Maggini. But according to Dr Fellowes's article in Grove (5th ed.) he was not a pupil of these makers but a contemporary. In his instruments we can see the evolution of the violin out of the viol—in fact Andrea made viols as well as the newer violin. His workmanship far excels that of the older masters. Unfortunately the delicacy of the fabric he used in their making has little favoured the preservation of Andrea's violins. They are strikingly original, but still preserve the antique Brescian upright sound-hole. The shape is extremely elegant, and the workmanship singularly fine. The belly and back of the violins are high in proportion to their other parts. The finish is amber varnish. This pattern produced exquisitely clear, sweet, and delicate tones, but the volume of sound was proportionately small. The tone of the fourth string was particularly weak. Andrea also made violoncellos and tenors. Andrea was succeeded by 2 sons, Antonio (1550-1638) and Girolamo (1551-1635), whose services to the craft were also signal. However, it was Nicolo (1596-1684), son of the latter, who was the greatest of the family. His violins have what the violins of the first lack—intensity and richness. This was acquired by using thicker wood and reducing the elevation. Stradivari was

the pupil of Nicolo. The fame of their descendant has somewhat eclipsed the renown of Andrea and his sons, but they will always be remembered for their pioneer work in the introduction of a new craft into Italy.

Amatitlán, town and lake in Guatemala. The town is situated at the W. end of the lake, formerly centre for the manuf. of cochineal. Hot springs have made it a flourishing resort. Pop. 6700.

Amato, or **Amatus**, **Joannes Rodericus** (1511-68), often called *Amatus Lusitanus*, b. Castel-Branco, Beira, Portugal, and was an eminent physician. He travelled in France, the Netherlands, Germany, and Italy, and practised his profession in Ancona till 1555, and from there he went to Pesaro and Thessalonica (Salonica). His 2 works, *Exegmata in Prioris Duos Dioscoridis de Materia Medica Libros* (Antwerp, 1536), called in subsequent eds. *Enarrationes in Dioscoridem*, and *Curationum Medicinalium Centurie Septem*, show an intimate acquaintance with the writings of the Gk and Arabic physicians, and contain curious information both in medicine and in natural hist.

Amatol, see *EXPLOSIVES*.

Amatongaland (Tongaland), portion of Natal Prov., situated on the E. coast of S. Africa, N. of Zululand and S. of Portuguese E. Africa. The inhab. are chiefly Tongas, a div. of the Bantu race, and number about 40,000. A. was annexed to Natal in 1897, being previously a part of Zululand. Prior to that time it was ruled by an hereditary dynasty under Brit. supervision. The area is 600 sq. m.

Ammaurosis (Gk *amauros*, dark), partial or total blindness where the outward appearance of the eye is unaffected, and usually caused by affections of the brain.

Ama-Xosa, or **Xosa**, an important div. of the Bantu people. Their complexion is dark, nostrils broad, lips thick, hair woolly. They are sharp-witted and courageous. They inhabit chiefly Transkei, Tembuland, and Pondoland.

Amaziah, or **Amaziah** (c. 797-769 BC), literally 'one strengthened by Yahweh,' 9th King of Judah; succeeded his father Jehoash, whose murder he avenged (2 Kings xiv. 5; 2 Chron. xxv. 3), and gained a great victory over Edom in the Valley of Salt, taking Sebah of Petra. A. declared war on Jehoash, King of Israel, but was defeated and taken prisoner. Jerusalem was taken and plundered. A., after having recovered his liberty, was slain at Lachish, where he fled from a conspiracy against him.

Amazon, the largest riv. (if measured by vol. of water carried) in the world, flows through S. America. It has a great network of tribs. which drain and water a vast extent of ter. It is also designated by various local names according to the dists. through which it flows. To this riv., or especially the Peruvian portion of it, the name *Marañon* is frequently applied. Though some hold that *Marañon* is of Indian derivation, modern geographers incline to trace it to the Sp. word *maraña*, which means (1) tangled underwood; (2) a tangled skein; and

conclude that the word describes the tortuous course of the riv. or the rough country through which it flows. So also geographers tend to reserve the name Marañon for the more N. of the 2 head affluents of the A., the other being the Ucayali. Discovery of the riv. (1500) is attributed to Vicente Yañez Pinzon, a Spaniard. He called it the Rio Santa Maria de la Mar Dulce, afterwards corrupted into Mar Dulce. The word A., the most general name for the riv., is said to be derived from the Indian word *amassona*, a boat-destroyer, because the riv. at certain places and in certain seasons is very dangerous; but the name may simply have been suggested by the encounters of the early Sp. explorers with the fighting men of savage tribes who wore their hair long. Some difficulty in distinguishing the affluents makes the exact estimation of the length of the riv. itself subject to dispute. The length given is about 3300 m. with the Marañon; or between 3700 and 3900 m. with the Ucayali (including the Apurimac); so great is the vol. of water discharged from its mouth, that fresh water is said to be found on the surface of the ocean 40 m. out. The riv. and its tribs. drain an immense area—nearly one-half of S. America, about 2,700,000 sq. m. The prin. tribs. are the Tocantins, the Xingú, the Tapajós, the Madeira, the Purús, the Ucayali, the Negro, the Yapura, the Nago, and the Morona. The Casiquiare, a unique natural canal, covering 180 m., connects the Orinoco with the Rio Negro, and is a most interesting natural phenomenon. The riv. with its tribs. to a large extent is navigable, but is rendered dangerous by floods and rapids, e.g. the tidal phenomenon the bore or *pororoca* in the main stream of the lower riv. The natural resources of the area have consequently been slow in development. The riv. flows through deep gorges and vast forest stretches which are but thinly populated. The climate is naturally hot and vaporous, but is rendered equable by trade winds which blow regularly through the dry season. The riv. abounds in fish, but eatable meat and fruit are difficult to procure in the locality. The A. is subject to ann. inundations. The waters rise early in Nov. and reach their maximum height in June, and then the vol. decreases steadily till the end of Oct. The rise and fall of some of the affluents are not coincident. The riv. is navigable for ocean steamers for some 1000 m. to Manaus; and Lquitos, about 2300 m. from the sea, is at the head of navigation for ships of less than 14 ft draught. Belém, or Pará, on the Tocantins channel, and Manaus, on the Negro, are the 2 chief ports. The main channel of the A., though up to 6 m. wide, is dangerous to navigation owing to shifting is. and sand-banks; ocean vessels therefore use the Tocantins channel 200 m. to the S. In 1867 the riv. was opened to the commerce of all nations at certain points, i.e. Tabatinga on the A.; Cametá on the Tocantins; Santarém on the Tapajós; Borba on the Madeira; Manaus on the Rio

Negro. The forest tracts which the great riv. divides are to a large extent undisturbed. The wide variety of evergreens includes valuable hardwoods. Through the tangled growths the sun scarcely penetrates, and the fauna and flora are still incompletely classified, though sev. scientific expeditions have been made with that object. The most notable product of the basin is rubber, which early in the cent. was exported in large quantities. Being wild rubber and difficult to collect, however, it stood no chance in competition with the rubber of the E. Indies as soon as the plantations came into bearing. During the First World War, therefore, when shipping was scarce and few imports could be relied upon, the inhab. of the A. basin turned again to the growing of sugar-cane, corn, manioc, brazil-nuts, cinchona, cotton, tobacco, ipêcuanha, sarsaparilla, and vanilla, all of which are now exported, especially sugar, in commercial quantities. Some rubber is still exported, chiefly from Belém and Manaus; also hardwoods. So far progress in trade and agriculture has been hampered by the difficulty of obtaining food supplies and inadequate transportation facilities. The Mamoré-Madeira railway, 220 m. in length, which was opened in 1912, has reduced transport difficulties in one direction by circumventing the 200 m. of rapids and falls of the great Madeira. Expeditions to study the industrial possibilities of the dist., as the Fleming expedition of 1919, and that of the Amer. Rubber Mission in 1923-4, give further promise of future development. As yet, however, the land is for the most part still virgin and very difficult of access. Further knowledge was gained of the ter. in 1924, when an expedition under Dr Hamilton Rice explored and mapped the Rio Negro with the aid of a hydroplane. The pop. of the A. basin is estimated at 1,500,000. See A. R. Wallace, *A Narrative of Travels on the Amazon and Rio Negro*, 1853; H. W. Bates, *The Naturalist on the Amazons*, 1863; J. Orton, *The Andes and the Amazon*, 1870; H. M. Tomlinson, *The Sea and the Jungle*, 1912; J. F. Woodroffe, *The Upper Reaches of the Amazon*, 1914; K. G. Grubb, *Amazon and Andes*, 1930; P. Fleming, *Brazilian Adventure*, 1933; F. McDermott, *The Amazing Amazon*, 1933; A. S. N. Wadia, *A Thousand Miles up the Amazon*, 1936; E. P. Hanson, *Journey to Manaus*, 1938; W. N. Merryman, *Northern Caballero*, 1941; A. Fiedler, *River of Singing Fish*, 1948; Willard Price, *The Amazing Amazon*, 1952.

Amazonas: 1. Northernmost and largest state of Brazil and a federal state of the rep. It is watered by the Amazon, and has an area of 614,913 sq. m. The country for the most part is plain-land, covered with vast undisturbed forests, and subject to ann. flooding. The chief products are india-rubber, brazil-nuts, hardwood, and cacao. Valuable vegetable products are also found. The cap., Manaus, is a flourishing tn. Pop. (State) 530,920; (Manaos) 110,000.

2. N. dept. of Peru. Area 13,948 sq. m. The rvs. and mts of the country greatly impede trade, though Chachapoyas, the cap., has a fine cathedral and airport. Pop. about 107,000 (plus 20,000 Indians, estimated).

3. Large ter. in extreme S. of Venezuela, adjoining 1. It is drained by the Orinoco and Rio Negro. It is covered with dense forests which supply valuable rubber. Cap. Puento Ayacucho. Pop. 7000 (plus 40,000 Indians).

Amazons (Gk 'breastless'), legendary race of female warriors said to have come from beyond the Caucasus and settled in Asia Minor. They were governed by a queen, and according to some authorities the female children had their right breasts cut off in order to facilitate their use of the bow. The male children were killed or banished, and the race was preserved by periodical union with men of a different race. The A. constantly recur in Gk literature from Homer onwards, and were believed to have invaded Attica at a date corresponding to 1256 bc according to the Parian Marble. In art they are sometimes represented with two breasts, but with the right one bared. The legend of the A. is probably connected with invasions of beardless nomads (Scythian and Mongolian) from the Russian steppe. See J. Forsdyke, *Greece before Homer*, pp. 104 ff., 1956.

Ambala, name of a dist. of E. Punjab, India, and its chief city. Here was ratified, in 1869, the treaty between Lord Mayo, Governor-General of India, and the Amir Shere Ali of Afghanistan.

Ambassadors, diplomatic envoys sent by a king, or the head of a great state, to a foreign gov. to represent him, negotiate his affairs, and guard the home interests abroad. He bears credentials in the form of a sealed letter signed by the sovereign who sends the embassy, by which it is understood that his negotiations will be regarded as if transacted by the sovereign himself. Tradition has estab. that only important kingdoms and states are at liberty to negotiate by means of A. proper. Lesser states negotiate by means of ministers of the second rank. An ambas. is distinguished from a minister of the second rank by the right of transacting his negotiations in the king's presence in public and private, but in practice the sovereign with whom he has transactions is attended by his ministers. As representing the person of the sovereign, an ambas. is entertained at the foreign court with ceremony and pomp. He is not subject to the laws of the state in which he resides, and the exemption applies also to his suite, but violent abuse of this privilege may lead to his recall.

Ambato, tn of Ecuador, cap. of Tungurahua prov., about 70 m. S. of Quito between Chimborazo and Cotopaxi; altitude 8435 ft. In 1698 A. was destroyed by an eruption of Cotopaxi, and again in 1796, 1949, and 1951 by severe earthquakes; but it is now recovering. It trades in grain, cochineal, and sugar, and has shoe manufacturers. It is also a vine- and fruit-growing dist., the climate

being temperate. A. is connected with Guayaquil and Quito. Pop. 38,500.

Amber, anct. cap. of Jaipur, now part of Rajasthan, India, about 5 m. from the city of Jaipur, the present cap. It is most picturesquely situated and contains the very fine Old Palace (1600) in excellent preservation.

Amber, resinous fossil. The name is Arabic, but has reached us through the French. Thales, one of the 7 sages of Greece, discovered its power of attraction when subjected to friction. Friction generates negative electricity in A., and the word electricity is itself derived from the Gk word *elektron*, meaning A. A., though now a mineral product, was originally a distillation from an extinct coniferous tree. It frequently preserves within itself plant-structures and insects. The Gk legend is an explanation of its resinous origin. A. among the ancts was said to be the tears of the sisters of Phaethon, who, on account of their grief for his death, were metamorphosed into poplars. A. is of a golden hue varying greatly in intensity. The bluish tints occur when pyrites are present. A. is sometimes transparent and sometimes opaque. The cloudy appearance is caused by imprisoned bubbles. The chemical formula is $C_{10}H_{16}O$. A. melts at $280^{\circ}C$. Succinic acid is obtained from A. by dry distillation, and it is this that produces the aromatic odour familiar to those who have burned the substance. A. is obtained in greatest quantities at the Baltic. After storms quantities of A. are found cast up on the shore. Systematic dredging and mining operations are carried on in the sea and in the 'blue earth.' A. has a wide distribution, being found in varying quantities in Europe, Australasia, and America. A., when immersed in a hot oil-bath, becomes soft, and pieces of it may be fused by dipping the required parts in hot oil and pressing. A. is largely used for personal adornments, vases, mouthpieces of pipes, etc. An artificial A. is occasionally substituted composed of copal, camphor, and turpentine, which is detected by the fact that it melts in cold ether, whereas real A. remains unchanged.

Amber-fish, or **Yellow-tail**, spiny-finned fish of the genus *Seriola* and family Carangidae. These are large, active shoaling fishes, the larger species growing to about 6 ft.

Amberg, Ger. tn in the *Land* of Bavaria (q.v.), 92 m. N. by E. of Munich (q.v.). It has medieval walls, a castle, and sev. fine old churches, including the 15th-cent. Gothic *St Martinskirche*. There are iron-working industries which date back to the 14th cent. Pop. 43,000.

Amberger, Christoph (1500-62), Ger. painter, b. Nuremberg and d. Augsburg. He painted in oil and in tempera, chiefly portraits, the most important of which are 'The Emperor Charles V.' 1532, Berlin Museum; 'Hieronymus Sulzer,' 1542, Gotha; 'Sebastian Münster,' 1552, Berlin Museum; 'A Portrait of a Man,' Brussels Museum; and a Madonna in the cathedral of Augsburg.

Amberggris, waxy substance found floating on the sea or in the gut of sperm whales. It seems to be associated with the beaks of the squid that the whale consumes. It has a fragrant musky odour when warmed, and is used in the form of an alcoholic extract as a highly valued fixative in fine perfumes, to which it imparts a subtle velvety and great tenacity. It has been used in past cents. as a stimulant in nervous diseases and is still being used in the Far E. for its reputed aphrodisiac properties.

Ambert, Fr. tn, cap. of an arron., in the dept of Puy-de-Dôme, on the Dore. It has many old buildings. Textiles, paper, and cheese are manuf. Pop. 7000.

Ambianum, late Lat. name for Samarobria, the modern Amiens (q.v.).

Ambidexterity, capacity of using both hands with equal facility. Some philosophers maintain that man is born ambidextrous, and that the habit of using the right hand in preference to the left is acquired. An argument against this theory is the fact that nearly all savage peoples use the right hand more than the left. A. is cultivated in certain schools of drawing.

Amble, port in Northumberland, England, at the mouth of the R. Coquet, 1½ m. from Warkworth, with a good beach and caravan camping sites. Pop. 4800.

Ambleside, mrkt tn of Westmorland, England, 13 m. NW. of Kendal, and ½ m. from the head of Lake Windermere. Picturesquely situated, it has many literary associations. In the vicinity are Rydal Mount, Wordsworth's house; Fox Howe, a summer residence of Thomas Arnold; and the Knoll, home of Harriet Martineau. It is an attractive tourist resort. Pop. 2400.

Amblygonite, mineral similar in appearance to feldspar. It is a lithium and aluminium fluophosphate, Li(AlF)PO₄, and is used in commerce for the extraction of lithium.

Amblyopia, dimness of vision not due to refractive errors or organic disease of the eye. It may be congenital or acquired. In the latter case it is sometimes due to hysteria, but more often to the use of tobacco or ethyl and methyl alcohol, and in some cases to poisons such as lead, arsenic, quinine, and ergot. The condition is progressive and may ultimately, though rarely, lead to total blindness. The centre of the field of vision is most affected, and there are blind spots for both red and green. The cause is said to be retrobulbar neuritis or inflammation of the eyeball part of the optic nerve. The treatment consists in avoidance of the predisposing cause.

Amblyopsis (Gk *amblyos*, obtuse; *ops*, eye), the Kentucky blind-fishes, a species belonging to the teleost order Microcyprin. They live in subterranean waters and have very degenerate eyes.

Amblypoda, extinct group of large unguligrade mammals which lived in Palaeocene and Eocene times.

Amblystoma (Gk *amblyos*, obtuse; *stoma*, mouth), genus of salamanders of the order Urodela, mainly found in N. and

S. America. The larva of *A. tigrinum* is the axolotl, which at this stage may become sexually mature and lay eggs; it occurs in the U.S.A., Vancouver, and Mexico. Some axolotls never normally metamorphose into A.s., but may be made to undergo the change by administration of thyroid gland.

Ambo, reading pulpit for the reading of the Gospel and the Epistle in early basilicas.

Amboise, Georges d' (1460-1510), Fr. cardinal and statesman. He gained the favour of the Duke of Orleans, and through his influence was made Archbishop of Narbonne (1492) and subsequently of Rouen (1493). On the accession of the Duke of Orleans to the throne as Louis XII, A. was made cardinal and chief minister. His foreign and domestic policies were moderate and beneficial. On the death of Alexander VI he hoped to become pope, but was unsuccessful, and the remainder of his life was occupied with abortive scheming. He was buried at Rouen, where a fine Renaissance tomb was erected.

Amboise, historic Fr. tn in the dept of Indre-et-Loire, on the Loire (q.v.). Its château, one of the finest of the Loire châteaux, rises on a terrace above the riv., and was a residence of the Valois (q.v.) until an attempt in 1560 by the Huguenots (q.v.) to carry off the young king Francis II (q.v.). It was damaged during the Second World War, but has since been restored; the beautiful Gothic 'King's Lodge' dates from the 15th cent., as does also the tiny Chapel of St-Hubert, which is thought to contain the remains of Leonardo da Vinci (q.v.). There are other notable buildings in the tn, including a 12th-cent. church. The prin. manufs. are agric. machinery and textiles. Pop. 6500.

Amboyna, Amboina, or Ambon, is, and tn in Moluccas, Indonesia, in the Banda Sea, 7 m. S. of the SW. coast of Ceram. The interior is mountainous with a fertile coastal plain. Agric. products include nutmegs, cloves, rice, and sugar. The tn on the S. coast exports copra and spices. Portuguese, Brit., and Dutch forts were estab. in the 16th and 17th cents. (a massacre of British took place at A. by the Dutch, 1623). Occupied by the Japanese in Second World War, and became part of Indonesia in 1950. Area c. 20,000 sq. m.; pop. c. 40,000.

Ambracia, tn of anct Epirus. It was colonised c. 640 BC by Corinth. It became a democracy, but retained strong allegiance to Corinth. In the Peloponnesian war it played an important part. During the Macedonian supremacy it was autonomous, but eventually became the cap. of Pyrrhus's kingdom.

Ambracian Gulf, see ARTA, GULF OF. **Ambriz**, Portuguese seaport of W. Africa, which exports produce of the numerous plantations of the dist., principally vegetable oils.

Ambrose, St (c. 340-97), one of the most celebrated fathers of the Church, b. Trèves, in Gaul, where his father was praetorian prefect. After practising at the

Rom. Bar he was appointed governor of Liguria and Aemilia and made his official residence at Milan. In 374, while preparing to keep order at the episcopal election there, he was chosen bishop by popular acclamation, although he was still a catechumen. A. was consecrated on 7 Dec., a date which is now observed as his feast. He had accepted the post with extreme reluctance; but he proved to be one of the greatest bishops of all time, helping to crush Arianism, and even venturing to rebuke the Emperor Theodosius for the massacre of Thessalonica (390). He combined political genius with great theological acumen and a polished literary style. It was largely due to his preaching that St Augustine received the light of faith.

Ambrosia, mythical food of the gods, their drink being nectar. The word signifies 'immortal,' and A. was said to be able to bestow immortality on mortals, as in the case of Tithonus and Berenice. A. was also mythically applied to wounds and used as a hairdressing.

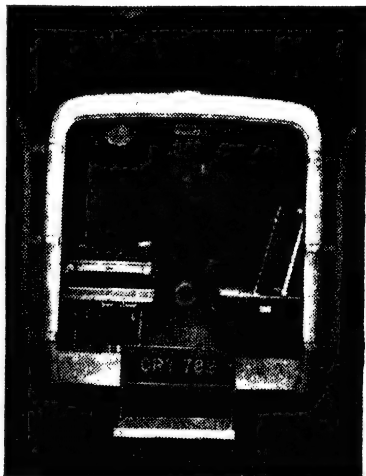
Ambrosian Chant, name given to the collected plainsong of the early Church, arranged by St Ambrose (q.v.). Of these chants we have no extant specimens, or, if we have, they are indistinguishable from the Gregorian chants of Pope Gregory, by which they were superseded in the 6th cent.

Ambrosian Library, famous library at Milan founded (1609) in memory of St Ambrose by Cardinal Borromeo. It numbers 400,000 vols. and 10,000 MSS. Among its most famous possessions are a Gk Pentateuch, 5th cent., a Josephus on papyrus, a Plautus, and a commentary on the Psalms by St Jerome. In air attacks in the Second World War fire severely damaged the building, but the most valuable contents were saved from destruction.

Ambrosius Aurelianus, or **Emrys** (fl. 5th cent.), Brit. military leader, probably of Rom. stock. He is referred to by Gildas, and is said to have driven the Saxons back to the is. of Thanet.

Ambulance (Lat. *ambulare*, to go, through Fr. *hôpital ambulant*), conveyance in which the disabled in battle or in civil life are removed to hospital, or in which patients are treated in default of hospital wards. For field use A. wagons were first introduced by the French as late as the end of the 18th cent. Larrey (1766-1842) was the inventor, and had the fervent support of Napoleon. Improvements were made by the French on the method of Larrey, e.g. a corps of stretcher-bearers was organised. In the Crimean War the British had no systematic A. corps, and attention to this dept was only given after Lord Herbert's commission of 1857-8. This method of first aid was subsequently adopted by other powers, and by the convention of Geneva (1864) the patients and the A. staff were secured neutral protection. Various independent charitable societies render A. aid in time of war. A civil A. association was first organised in England in 1878 by the Knights of St John. This society pro-

vided training in first aid, that assistance might be at hand for those who sustained injuries in civil life. The success of the enterprise led to the formation of A. corps in all parts of the country, and now policemen, railwaymen, and factory employees hold certificates of the association. This society also provides auxiliary relief forces which co-operate with the Royal Army Medical Corps in treating those who are injured in time of war. The evolution of A. work has been rapid and a notable success. An A. service is one of the provisions of the Brit. National Health Service (inaugurated in 1948), and the National Health Service Act, 1946, placed on local authorities the duty of administering it.



Lomas

INTERIOR OF A ST JOHN'S AMBULANCE

Ambulatory, in architecture, the space enclosed by a colonnade or an arcade. It is the name used for any part of a building intended for walking in, as the aisles of a cathedral or church. In the peripteral temple of the Greeks the lateral or flanking porticoes are properly termed A.s; and the cloister of a monastery is surrounded by an A.

Ambuscade, or **Ambush** (obsolete Embush). Both words are derived ultimately from the late Lat. *imboscare*. As the derivation shows, this term originally signified a military manoeuvre whereby troops were concealed in wooded ground in order to make a covert attack on the enemy, but now the word is more loosely used to denote a surprise attack of any description. An A. is an obvious manoeuvre of self-defence and is employed in the most rudimentary warfare. Ditches, trenches, and covers of that nature are merely developments of this simple ruse.

The great advantage to be derived from an A. is the fact that by its skilful manipulation a small company of men may gain the supremacy over troops which far outnumber them. The wide range of modern appurtenances of war and more advanced military tactics have made the employment of the simple ambush useless.

Ameer, see **EMIR**.

Amelanchier, genus of small deciduous shrubs and trees, family Rosaceae, about 25 species. *A. ovalis*, the Snowy Mesquill, of S. Europe, and *A. canadensis*, the Shad-bush of N. America, are popular in gardens.

Ameland, one of the Friesian Is. situated off the coast of Friesland, Netherlands. The inhab. are mostly fishermen. Pop. 3000.

Amelia: 1. Port on Pemba Bay in Portuguese E. Africa, a great natural harbour capable of development. 2. Is. in Nassau co., Florida, U.S.A., about 13.5 m. long.

Amelle-les-Bains (formerly **Bains-d'Aries**), Fr. spa in the dept of Pyrénées-Orientales. Its sulphur springs were known to the Romans. Pop. 2900.

Amen, **Amun**, or **Ammon**, originally an obscure deity of Thebes; became the supreme deity with the victory of the 18th (Theban) dynasty over the Hyksos, when the rivalry of Ra (q.v.), the older supreme sun-god of Heliopolis, was eliminated by the association of A. with Ra as Amen-Ra. The priests of Amen-Ra at Thebes became very rich and powerful. Other centres of his worship were Siwa and Napata. He is usually represented in human form (sometimes with a ram's head), with 2 very tall feathers on his head; sometimes as a ram.

Amen, Heb. liturgical word of affirmation; also used as a response at the conclusion of a doxology, prayer, etc. Justin Martyr is the first of the fathers who speaks of this latter use. The word varies in meaning according to its position. It has usually a final or detached position, and signifies 'So let it be.' The use in the gospels of A. (or more frequently a double A., trans. in A.V. 'verily, verily') is peculiar. The 'flat' force of the word is there lost, and it merely lays stress on an important statement about to be made.

Amende Honorable was in the old Fr. laws a public confession made by persons guilty of crimes coming under the head of public scandals, and was accounted an infamous punishment. It might also be a public acknowledgment of an injury to the reputation and honour of another; and in England the expression is used when a person publicly admits any wrong done to another.

Amendment, legal term signifying the correction of mistakes in the written records of judicial proceedings. For A. in the sense used in parliament and public meetings see HOUSE OF COMMONS (PROCEDURE). In ancient times, once proceedings were entered on record no A. however formal or trifling was permitted. This caused much inconvenience and expense, as an unsuccessful suitor, finding a mistake in the record made by a court

official, could deprive his opponent of the benefit of a judgment. An ordinance of Edward I required the judges to record the pleas placed before them and forbade them to amend the court records. The hardship caused by this ordinance necessitated the passing of a series of statutes of A. and statutes of *jeofails* (*jeo fail* or *j'ai failli*); the former permitted certain specific errors in the record to be amended, and by the latter judges were empowered to proceed to judgment notwithstanding such errors. The rules of court have been progressively modified until to-day when almost any A. in civil causes is allowed, provided that the A. does not subject the defendant to a larger pecuniary liability or embarrass him. In criminal causes the practice is more stringent, and once the indictment has been formulated at the assizes no A. is allowed. This stringency does not apply to the early stages of a criminal case in the magistrate's court, and it is for this reason that defence is so often reserved till after the committal of the prisoner to the assize court. The present law and practice of the courts is based mainly upon the Judicature Act, 1873, and, in Scotch courts, on the Court of Sessions Act, 1868.

Amenemhat, name of 4 Egyptian kings of the 12th dynasty. See EGYPT, *The Middle Kingdom*.

Amenhotep, or **Amenophis**, name of 4 famous Pharaohs of Egypt. A. I (c. 1570 bc), the son of Amasis I, conquered Nubia and Mesopotamia. A. II, son of Thothmes III, fl. c. 1500 bc. He was an energetic ruler, who suppressed a revolt in Asia. A. III, son of Thothmes IV, fl. c. 1450 bc. He devoted his reign to building. He constructed the great temples at Thebes, of which the ruins of the temple of Luxor remain. The Vocal Memnon, mentioned in Herodotus and Tacitus, is one of two colossal statues which stood before his funerary temple (no longer existent). A. IV was Akhnaton (q.v.).

Amenophis, see AMENHOTEP.

Amenorrhoea, see MENSTRUATION.

Amentet, Egyptian goddess, the personified West (*Ament*). She was often represented welcoming the dead to her realm, where she also received the setting sun.

Amercement, or **Amerciament** (from the Fr. *a merci*; from the Lat. *merces*, payment), term in O.E. law used to denote an arbitrary pecuniary forfeit imposed on an offender by a jury of his equals in status, or, if in the supreme courts, by the coroner. The amount of the pecuniary penalty was quite arbitrary, and was originally an alternative to a forfeiture of goods. The word in modern usages has practically lost its old technical sense, and is confined to poetical phraseology, where it has merely the meaning of a loss, fine, or deprivation of any kind.

America, general name given to the 2 continents which form the W. hemisphere, extending approximately from beyond 75° N. lat. to below 55° S. lat. The name, derived from Amerigo Vesputi (q.v.), who only reached the mainland of

N. A. sev. years after the discovery of the New World, is an historical accident. At the present day, 'America' and 'Americana' are often used as synonymous with the U.S.A., and a citizen of that nation respectively. As applied to both N. and S. A. the name is also anomalous, for the 2 continents have little in common and are all but disconnected physically. Geologists, seeking an explanation of the grouping of the continents of the world in the tetrahedral deformation of the earth's crust, afford some justification for treating N. and S. A. as a single geographical unit. There is, however, a recognised tendency in all land masses to assume the form of pyramids, with their vertices directed towards the S. This is strikingly exemplified in the form of both N. and S. A. Again, in some respects the general outlines of both are similar, and both have ranges of volcanic mts in the W. running almost due N. and S., and both are watered by similar great rvs. The physical features of both are on a vaster scale than the physical features of Europe. The rvs. are extremely long, the lakes very large, the prairies or *llanos* extensive. For the rest, however, the diversities are so great that it is more convenient to treat them separately. For the geology, ethnology, fauna and flora of A. see NORTH AMERICA and SOUTH AMERICA; for physical features, climate, products, manufs., forms of gov., hist., etc., see CANADA, MEXICO, UNITED STATES OF AMERICA, and the various countries of CENTRAL AMERICA; and ARGENTINA, BRAZIL, CHILE, and other countries of S. A.

American Architecture is here treated as the architecture of the United States only: other parts of America are dealt with elsewhere (see CANADIAN ARCHITECTURE and LATIN AMERICA, *Architecture*).

There were Sp. settlements on the coast of Florida, etc., before the end of the 16th cent.; but for all practical purposes the story of A. A. begins in the Brit. colonies of Virginia (founded in 1607) and New England (founded by the Pilgrim Fathers in 1620). In each case the colonists erected no permanent buildings during their first years, being preoccupied with defending themselves against the Indians and contenting themselves with temporary wooden buildings protected by stockades. Within a generation a small brick Gothic church (still standing) was erected at Jamestown in Virginia in 1632, and other brick buildings followed. In New England, where no brick was available, all the houses were timber-framed, covered with 'clapboards' (weatherboarding), and roofed with shingles. This type of building became very popular in New England, and still continues to be repeated. The beautiful parsonage at Topsfield, Massachusetts (1683), is a fine surviving example; another is the 'House of the Seven Gables' at Salem, Massachusetts. In 1623 the Dutch founded New Amsterdam, which was captured by the British in 1664 and rechristened 'New York'; but not a trace remains

there of the picturesque Dutch *gabled* houses which, in old engravings, recall European Amsterdam. Towards the end of the 17th cent., when the Brit. occupation of all the N.E. states was securely estab., a more formal and ambitious type of architecture was introduced from England. A splendid example exists in Williamsburg, founded 1691 as the new cap. of Virginia, and restored to its original appearance from 1925 onwards, regardless of cost. Here is the handsome William and Mary College (1693-7), vaguely reputed to have been designed by Wren (q.v.), and certainly characteristic of his style. Other fine buildings are the country mansion of Westover in Virginia, c. 1726, and George Washington's home at Mount Vernon (1743, enlarged 1785). From c. 1720 onwards the influence of the Eng. Palladian style, and later that of Robert Adam (q.v.), is very apparent. The White House at Washington was built in 1792-9, and the Capitol at Washington was begun in 1793. Thomas Jefferson (q.v.), whose name is familiar as the third President of the U.S.A., but who also practised architecture, built himself a charming house called Monticello in Virginia (1796-1809), and designed, among other things, the Capitol at Richmond, Virginia (1785-9). America was now independent of Britain, but continued to follow her architectural fashions; so in due course the 'Greek Revival,' the 'Gothic Revival,' and the 'Free Classic Revival' arrived from across the Atlantic. In the third quarter of the 19th cent., however, the architect H. H. Richardson (q.v.) introduced a 'Romanesque Revival' which showed some originality; and his pupil, L. Sullivan (q.v.), attempted to devise a new Amer. style, independent of all revivals and obsolete traditions, notably in the Transportation Building at the World's Fair, Chicago (1893). His mantle fell, in turn, upon his brilliant pupil, Frank Lloyd Wright (q.v.), who became the leading architect of America by the middle of the 20th cent.; but from c. 1900 to c. 1950 most of the important buildings in the U.S.A. were designed by architects trained in the classical tradition at the Ecole des Beaux Arts, Paris; though some of them favoured Gothic, especially for churches and for collegiate buildings. Their names, with their prin. buildings, are dealt with separately (see CORBETT, H. W.; CHAM, R. A.; GILBERT, C.; HUNT, R. M.; McKIM, C. F.). The invention of the skyscraper (q.v.) in the latter part of the 19th cent. was due partly to the tremendously high cost of land in the centre of New York and other Amer. cities; but partly to the nature of the rock subsoil of New York, capable of sustaining immense loads.

Political and racial persecution in Germany and central Europe during the second quarter of the 20th cent. led to the settlement in America of many distinguished architects. Many became profs. in Amer. univs.; all created large practices and became dominating forces in the trend of architectural design (see

Georgius, Naum, and others (Van der Borch). The powerful influence of Frank Lloyd Wright, however, still persisted, and gave A. A. a distinctive character. See T. E. Tallmadge, *The Story of Architecture in America*, 1928.

American Art Museums and Galleries. The U.S.A. has become an increasingly important centre of art, owing to the great benefactions of her millionaires. Thus the Metropolitan Museum of Art in New York City, already one of the great museums of the world, has been enriched by legacies of their entire art collections by the late Benjamin Altman and Henry Frick, in each case the gifts being estimated as worth some 25 million dollars; and the museum thus acquired some of the finest specimens of the work of Rembrandt, Hals, and other European old masters (see F. H. Taylor, *Art Treasures of the Metropolitan*, 1953). A more recent foundation (1929) made possible by munificent private support is the Museum of Modern Art, New York, which under the direction of Alfred H. Barr, Jr, has acquired examples of every new development in 20th-cent. painting, sculpture, and design. The National Collection of Fine Arts at the Smithsonian Institution, Washington, D.C., and the National Gallery of Art, formed through the gifts of the late Andrew Mellon, together constitute what may be regarded as the National Galleries of the U.S.A. A nucleus was the bequest of Harriet Lane Johnston, consisting of paintings by Beechey, Constable, Hoppner, Lawrence, Romney, Reynolds, Luini, and others. About the same time Charles L. Freer of Detroit gave his extensive art collection, including works by Chinese and Jap. artists, and also representative examples of the work of Amer. painters, Whistler being extensively represented. The next gift of importance was the collection of 24 old masters given by Ralph Cross Johnson, including works by Coques, Flnek, Francia, Gainsborough, Guardi, Hogarth, Lawrence, Lotto, Maes, Mainardi, Van Orley, Racburn, Rembrandt, Romney, Rubens, Titian, Turner, and Wilson; and in 1907 Wm T. Evans inaugurated his gift of paintings by contemporary Amer. artists, which by 1916 numbered 151 paintings by 107 artists. In 1929 John Galtaly gave his collection, which included 142 paintings by 44 Amer. artists and 22 by European artists, including Gonzales, Guardi, Puvis de Chavannes, Rubens, Tiepolo, and Van Dyck. In 1935 came the announcement of the plans of Andrew W. Mellon to present to the gov. his great collection of paintings and also to furnish funds with which to erect at Washington a building, to be called the National Gallery of Art, or a similar name. The completion of these plans was expected to place the U.S.A. upon an equality with other nations in regard to great art possessions. The building under the Mellon fund was completed in 1940, and is known as the National Gallery of Art, the former National Gallery of Art of the Smithsonian Institution being now known

as the National Collection of Fine Arts. The latter collection, besides the works mentioned above, contains a number of works by contemporary Fr. artists. The permanent collection in the National Gallery formed under the Mellon fund includes the Mellon collection of 126 paintings, chiefly of the It., Flem., Dutch, Eng., and Amer. schools, and 24 pieces of sculpture of the It. Renaissance, as well as the Kress collection of 375 paintings, 18 pieces of sculpture, and 400 Amer. prints.

Famous painters of all countries are well represented in the Boston Museum of Fine Arts, among the most notable being Fra Angelico, Rogier van der Weyden, Fiorenzo di Lorenzo ('Madonna and Child and St Jerome'), Piero della Francesca ('Madonna and Child'), Andrea Mantegna, Velazquez ('Don Baltazar and his Dwarf' and 'Infanta Maria Theresa'), El Greco ('Fray Felix Hortensio'), J. M. W. Turner ('The Falls of the Rhine at Schaffhausen' and 'The Slave Ship'), Manet ('Kneeling Monk'), Gauguin, and Van Gogh ('The Postman Roulin'). The paintings in the Fogg Art Museum (Harvard Univ.), which was founded by a bequest of Mrs Elizabeth Fogg (1891), include many by It. masters—Fra Angelico, Ghirlandajo, Botticelli, Simone Martini, Giovanni di Paolo, Girolamo di Benvenuto, and Cosima Tura; also, of the Sp. school, paintings by Luis Borrassa, Ribera, and Murillo, and, of the Fr., paintings by Cézanne, Monet, Renoir, Degas, Forain, Manet, and Toulouse-Lautrec; and also paintings by Copley, Gainsborough, and Van Dyck. The Art Institution of Chicago has a collection of over 1000 paintings, including Fr., Dutch, Flemish, It., and Amer., together with prints and drawings by Rembrandt, Whistler, Méryon, Toulouse-Lautrec, Zorn, Bredin, and others. The Cincinnati Art Museum has paintings by Mantegna ('Tarquin and the Cumæan Sibyl'), Lucas Cranach the elder ('St Helena'), Bernardino Luini, Lorenzo di Credi, Bronzino, Frans Hals ('A Dutch Family'), Rembrandt, Van Dyck ('John, Count of Nassau'), Gerard Ter Borch ('A Music Party'), El Greco, Murillo, Gainsborough ('Viscount Downe'), and a large group of Turner and Whistler prints. In the Wm Rockhill Nelson Gallery of Art, Kansas City (opened in 1933), are paintings by Titian, Veronese, Hals, Rubens, Goya, Rembrandt, Caravaggio, Tiepolo, El Greco, Hobbema, Poussin, Claude, Robert, Millet, Van Gogh, Ingres, Tintoretto, and Joos van Cleve. In the Carnegie Institute, Pittsburgh, founded in 1896, considerable interest is shown in contemporary Amer. paintings, and an international exhibition of paintings is held here annually. The permanent exhibits of the City Art Museum, St. Louis (reorganised 1909), include European and Amer. paintings—among them El Greco's 'St Paul.' Fine collections also exist at Cleveland, Detroit, Philadelphia, and Toledo. In Brazil a great art collection has grown up in the last few years, the São Paulo Museum founded in 1947, largely by the

vigorous effort of Senator Assis Chateaubriand. It now contains a Picture Gallery (strong in Fr. Impressionists), Schools of Art, Exhibition Halls for contemporary work, and an editorial dept publishing art magazines.

American Association for the Advancement of Science was the name given in 1847 to the new organisation of the former 'Association of American Geologists and Naturalists.' The first meeting was held on 20 Sept. 1848. The objects of the association are 'to further the work of scientists, to facilitate co-operation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.' In addition a number of independent organisations and societies are affiliated. The income which accrues from the permanent endowment of the association is mainly granted in aid of scientific research. The H.Q. of the association are at 1515 Massachusetts Avenue, NW., Washington 5, and the present number of members is about 50,000.

American Bankers Association, founded in the U.S.A. in 1875 'to promote the usefulness of banks,' represented in its membership in 1956 more than 99 per cent of the nation's banking resources. The 17,385 members included 13,906 head offices, 3303 branch banks, and 176 from foreign countries. Through the years its services have changed and expanded to deal with new techniques of management and operation, and relationships with the public, the gov., and such components of the economy as agriculture, manufacturing, merchandising, and transport. Between the ann. conventions the association is governed by its Executive Council composed of members elected from each state and the District of Columbia. Day to day activities are conducted by a permanent staff at the national H.Q. in New York City. The association has 2 major projects in banking education: the American Institute of Banking and the Graduate School of Banking. The institute offers courses to bank people in 465 cities and towns throughout the U.S.A., and in 1956 had an active membership of 127,006, with 68,599 enrolments in its classes. The Graduate School, for advanced study by bank officers, is conducted at Rutgers Univ., New Brunswick, New Jersey, with an ann. attendance of about 1100.

American Blight, a pest very common to apple-trees. It may be easily recognised by its dark brown colour and white covering. Spraying is essential to get rid of it.

American Civil War, see U.S.A.

American College Yells, see CHEERING.

American Federation of Labour, combination of craft and industrial unions founded in 1881 in Pittsburgh, Pennsylvania. It took the place of the Knights of Labour founded in 1869, which in the early eighties had a membership

of 700,000, conducted a large number of strikes, and then quickly declined. The A. F. L. was led by Samuel Gompers, a shrewd organiser of Brit. birth and Dutch-Jewish blood. Its policy was, from the first, conservative: it took the capitalist system for granted; and it made astute bargains with employers with as little reliance on the use of strikes as possible. No distinction of nationality, creed, or colour was to affect the rights of membership. By 1900 labour, under the aegis of the A. F. L., had become a power that no statesman could ignore. By ceaseless agitation the federation hastened compulsory education of the young, compensation for accidents to employees in industry, and health and sanitary regulations for all workers. It also pressed for the suppression of competitive convict labour and the restriction of alien immigration. During Roosevelt's New Deal the A. F. L. continued to represent most of the large craft unions; but beside it there arose a powerful new organisation, the Congress of Industrial Organisations (C.I.O.), which represented unskilled workers and labour in the mass-production industries. Under the C.I.O. collective bargaining received a new impetus; but there has inevitably been some rivalry between the 2 bodies. In foreign affairs the federation has supported Amer. participation in the World Court; the limitation of armaments; and Philippine independence—mainly to stop the immigration of Filipino labour. In general the A. F. L. has been strongly opposed to Fascism whenever it appeared. In 1933 it voted a boycott of Ger. goods and services until the Ger. Gov. recognised the rights of the working people of Germany to form independent trade unions; and in 1935 it voted concurrence with the League of Nations in declaring Italy an outlaw nation. In 1940 the federation came out strongly for full aid to Great Britain. There is now a labour dept and employment bureau in each of the Amer. states. The federation's official organ is the *American Federationist*.

American Independence, War of, see UNITED STATES OF AMERICA, *History*.

American Indians, aboriginal pop. of America. The use of the word 'Indian' is a misnomer due to Columbus's belief that he had found a new route to India. The name was kept, 'American' being added to distinguish them from the quite different races of India.

The A. I. are of the Mongoloid stock, being related to the Old World Mongols and having presumably originated in the Old World and crossed to America by the Bering Straits. All the Amer. Indian groups are physically very similar, with straight black hair, copper-coloured skin, aquiline nose, and prominent jaw. Today, however, the A. I. seldom remain in racially pure communities and are mixed with many other stocks (especially with whites) and have been affected by many different cultures, only a few indigenous Indian cultures still being in existence comparatively unaffected by outside contact.

A. I. may conveniently be divided into many large divs., which are based on differences of culture and language. Owing to intensive movement and interpenetration of tribes their distribution is a complex one. By 'tribe' is meant a distinct political group, and tribal boundaries are not necessarily the same as those based on language or culture. The main 'culture areas' usually distinguished are, in N. America: the Plains Area of the Middle W., based upon bison hunting; the Plateau and Basin areas to the W., near the Rockies; the California area, based on the acorn as staple food; the NW. or Pacific Coast area, based on dependence on salmon and sea food; the Eskimo area of the far N.; the Mackenzie area in the semi-arctic lands, based on the use of the caribou; the E. Woodlands area of the E. United States; the SE., based on maize, squash, and other vegetable foods; the SW. of Arizona and N. Mexico. In central or Meso-America are the Mayan and Aztec cultures; in S. America are the Chibcha area immediately to the S. of Costa Rica; the Inca area of the highlands of Ecuador and neighbouring ters.; the Guanaco area of the S., including Patagonia; the Amazon area of the Brazil forests; and the Antilles or Carib area of the Caribbean is. All these are marked by differences of economy, social organisation, culture, and language. Within each are many variations and many tribes, too many to list here. The most important are listed separately.

Besides classification by culture area, the N. Amer. Indian tribes are classified by language. There are many distinct stocks recognised in these many and diverse languages, the most important being *Eskimoan-Aleutian*; *Algonquian*, including many languages of the Atlantic coast area; *Iroquoian*, languages spoken in 3 distinct areas—Lakes Erie and Ontario, E. Virginia and N. Carolina, and S. Allegheny country; *Muskogean*, spoken in the Gulf region of U.S.A.; *Siouan*; *Caddoan* of the S. Plains; *Shoshonean* of the Great Basin region; *Athabaskan*, spoken in 3 areas—W. central Canada, the Pacific Coast, and the SW. United States; and *Salishan* of the NW. Coast. There are many smaller stocks, the distribution of which is extremely complex. These languages differ from one another in both phonetic and morphological respects. Some are polysynthetic or holophrastic, with long words each incorporating many notions; others are inflective, like Latin; others are analytic like English or agglutinative like Turkish.

Original Numbers and Causes of Decrease. The best available statistics indicate that at the time Columbus landed there were living in N. America approximately 1,250,000 Indians. By 1917 there were estimated to be about 380,000, and to-day there are perhaps 500,000. Factors that led to this decrease include smallpox and other epidemics; tuberculosis; sexual diseases; whisky and attendant dissipation; removals, starvation, and subjection to unaccustomed conditions; low fertility; wars. The

destruction by disease and dissipation has been greatest along the Pacific coast, where also the original pop. was most numerous. In California the enormous decrease from about 250,000 to less than 20,000 is due chiefly to the cruelties and wholesale massacres perpetrated by the miners and early settlers.

The contact of the A. I. with European races was for long very destructive to the former. The atrocities committed by the Sp. pioneers have long been a subject of shame to all white peoples. The A. I. do not easily withstand diseases not endemic, and countless natives succumbed to plagues and alcohol introduced by the Europeans. Whole tribes were exterminated, and the great majority of those who survived lost the civilisation that had reached an extremely high level in their free days and lapsed into decadence. Later the cruelties which had been inflicted on the people were recognised, and a new treatment was organised. To-day the curve of Indian pop. has taken a sudden upward swing and the drift towards assimilation has apparently slowed down. With these changes in the current of native existence has come a revival of Indian culture, the fruits of which no one can accurately foretell.

Arts and Crafts. The main employments of the people were agriculture and hunting. Before the advent of the Spaniards, beans, melons, potatoes, Indian corn, tobacco, cotton were all cultivated. Hunting was by means of intricate snares and nets. Spears, bows and arrows, harpoons, and clubs were the chief instruments employed. Sledges and skin-boats (coracles) were the chief means of transportation, and wheels were but little used. Arts and crafts were developed to a high degree, especially painting, on skin, bone, and pottery, and music played on drums, flutes, and rattles.

Religion. The religion of the A. I. is on the whole pantheistic. Divine power is manifest in all the operations of nature. This power was sometimes separately worshipped, according to the various phases in which it manifested itself. All the minor spirits had to be honoured and appeased with their own appropriate worship. This divine power was regarded in its oneness as the principle and origin of all life, infinite in power and eternal in duration. The soul of the individual was regarded as being immortal, inasmuch as it was a portion of the life principle, itself indestructible. In addition to their recognition of this divine power to dominate all existence, most tribes recognised their own peculiar demigod. This demigod was for the most part beneficent and benevolent, and was the guardian of the welfare of the tribe.

Social Organisation. Social organisation varied very considerably. Many tribes had only the simplest of clan organisations, others, such as the Inca, developed a complex state apparatus with a divine king. The highest organisations were those of Inca, Aztec, and Maya, and in N. America the Iroquois, Natchez, and Pueblo tribes. In S. and central America,

Cortés and the early Sp. invaders totally ignored the Indians' claims to humane treatment, though they witnessed the highest level of civilisation and advancement among them. The Sp. pioneers were regarded as gods—children of the sun. Advantage was taken of the ignorance of the people, and whole tribes were massacred to glut the Sp. greed for wealth. The rich gold ornaments and jewels of the Peruvians proved as attractive to Francisco Pizarro, the conqueror of Peru; nor did Pizarro fail to equal the atrocities of Cortés.

Present Conditions on Reservations. In the U.S.A. the Bureau of Indian Affairs was estab. in 1824 under the War Dept., and transferred to the Dept. of the Interior in 1849. For a long time it failed to prevent war with the Indian or improve his condition. To-day it is more successful in aiding the Indian in matters of agriculture, industry, education, and health. For a very long time the education of the A. I. had been of constant interest and the plan of many public-spirited bodies and individuals, but it is only comparatively recently that there has been any great response. It is not generally known that the original charter incorporating Harvard Univ. contains special provision for the education of Indians, while as long ago as 1873 the Amer. Gov., in the arrangements for Indian reservations, estab. boarding and day schools. Education of a rather higher nature was not seriously entered upon until the Indian School was started at Stockbridge, Massachusetts, in 1890. The younger generations of Indians are now making rapid advances, and, particularly in the S., are equipping themselves with professional knowledge and skill. During the last few decades the discovery of oil in the S. settlements and reservations has made the resident Indians enormously rich, so that there is now a great line of cleavage between them and their compatriots in the N., who still remain a poor race. An important point should not be overlooked: that the average Amer. citizen feels more kindly towards him than towards the other coloured races. It is not forgotten that he was the original owner of the soil, and now that he has ceased to hamper the advance of civilisation his rights are more fully recognised. This is exemplified by the fact that the veto on intermarriage of races is not in such strong evidence against Indians as against Negroes and Asiatics. Indeed, many contend that a drop of Indian blood improves the stock, and admit that the early settlers from whom good families spring intermarried with Indians. This attitude towards the Indians is, however, of comparatively recent date, and, in spite of laws that seemed fair, they were subjected to shameful ill treatment for a considerable period. Even now Indian administration presents serious problems in regard to economic and social conditions among the tribes. In the U.S.A. there are estimated to be 400,000 Indians, excluding Indians and Eskimoos of Alaska. Of the 400,000 about half are full-blooded

Indians and the remainder mixed with whites in varying degrees and, in the case of a few tribes, with Negroes. There are more than 200 reservations, most of them W. of the Mississippi R.; the largest number being in Oklahoma, Arizona, and S. Dakota. Of the total Indian pop. all but a very few are to a greater or lesser degree wards of the Federal Gov., and most of them live on Indian lands set aside for their use by the Gov. The Dept. of the Interior acts as trustee for the very large amounts of Indian tribal moneys accruing from mining and oil rentals or other sources of income. The right of citizenship was conferred on A. I. only in 1924; this gives the suffrage to all Indians b. in the U.S.A. The commonest occupations of the Indians of to-day are farming and the raising of cattle and horses; while many are engaged in the making of blankets and pottery and in embroidery, the chief market for the sale of their handicrafts being among tourists.

In Canada Indians are minors under the law, and their affairs are administered by a special branch of the Dept. of Mines and Resources under the authority of the Indian Act. Reserves have been set aside for the various bands of Indians in Canada since the earliest times, and the Indians located on them are under the supervision of the local agents of the departmental branch. The Indian Act provides for the enfranchisement of Indians. When an Indian is enfranchised he ceases to be an Indian under the law. Indians who become enfranchised lose the special protection attached to their wardship. There are approximately 128,000 Indians and Eskimoos in Canada.

See also APACHES; BLACKFOOT; CHEROKEE; CHICKASAW; CHOCTAWS; CLIFF DWELLINGS; COMANCHES; DACOTANS; FOX INDIANS; HIOPI; IROQUOIS; MOHAWKS; MOHICANS; MOUND BUILDERS; PAWNEE; PUEBLOS; SEMINOLES; SIOUAN; WYANDOTS; etc.

See F. R. Burton, *American Primitive Music*, 1909; F. Densmore, *The American Indians and their Music*, 1926; P. Radin, *The Story of the American Indian*, 1927; D. Jenness (ed.), *The American Aborigines*, 1933; F. Eggan, *The Social Anthropology of North American Tribes*, 1937; C. Wissler, *The American Indian*, 1938; E. R. Embree, *Indians of the Americas*, 1939; O. la Farge, *As Long as the Grass shall Grow*, 1940; J. Collier, *The Indians of the Americas*, 1947; J. R. Swanton, *The Indian Tribes of North America*, 1952; R. H. Lowie, *Indians of the Plains*, 1954.

American Law, *see* UNITED STATES OF AMERICA, *Law*; *see also* ACTION; EVIDENCE; etc.

American Legion, organisation of Amer. ex-service men and women, somewhat similar to the Brit. Legion, with patriotic and other motives of a high order. It was inaugurated in 1919. The idea originated among the troops in France. All who served between 6 April 1917 and 11 Nov. 1918, between 7 Dec. 1941 and 2 Sept. 1945, and between 25 June 1950 and 27 July 1953 in the naval, military, and air forces of the U.S.A. or associated

powers are (generally) eligible for membership. The Legion was influential in obtaining a bonus for Amer. veterans.

American Literature. In the colonial period preceding the revolution, A. L. was of necessity little but an offshoot of Eng., the earliest writers being in fact immigrants who were b. and educ. in England. As one might expect, the first writings are mainly descriptions of the new lands, reports of the progress of the communities, and personal journals recording the colonists' experiences. These works are of great historical value, and in modern times have been studied with increasing interest, some having been pub. in the 20th cent. for the first time. Among early writers may be mentioned Capt. John Smith (1580-1631), with his *True Relation*, 1608, and *General History of Virginia, New England, and the Summer Isles*, 1624; Wm Bradford (1590-1657), whose *History of Plymouth Plantation* was pub. in 1856; and Wm Byrd (1674-1744), author of the *History of the Dividing Line between Virginia and North Carolina*, 1729, whose *Secret Diary*, first pub. in 1940, has caused him to be styled the Amer. Pepys. Other diaries are those of Samuel Sewall (1652-1730) and Sarah Kemble Knight (1666-1727). Such creative writing as there was had mainly a theological trend. Cotton Mather (1663-1728), son and grandson of distinguished preachers, was one of the most learned Americans of his time, and in the intervals of his own church work wrote *Magnalia Christi Americana*, 1703, an eccles. hist. of the settlements; while Jonathan Edwards (1703-58), greatest of New England theologians, pub. numerous religious tracts. Little poetry was written, and it was mainly derivative in style. Anne Bradstreet (c. 1612-72), cited as America's first poetess, was b. in England, and her work follows Eng. fashions. The first typically Amer. writer was Benjamin Franklin (1706-90), whose autobiography, 1818, a work of the highest interest, was preceded by his *Poor Richard's Almanac*, a popular collection of pithy sayings. Political writing reached its highest mark with Thomas Paine (1737-1809), whose works, such as *Common Sense*, 1776, and *The Rights of Man*, 1791-2, had worldwide appeal.

Following the revolution, A. L. began to develop original lines in the 19th cent. There had already been a reaction against the Augustan tradition by the 'Hartford Wits,' Timothy Dwight, John Trumbull, and others, and Charles Brockden Brown (1771-1810) had reflected the early Romantic Movement with his 'Gothic' novels. But the first original Amer. writer of prose fiction was Washington Irving (q.v.) (1783-1859), whose first great success was *Knickerbocker's History of New York*, 1809, written in a vein of delightful humour. His *Sketch Book*, 1819, included 'Rip Van Winkle,' perhaps the most widely read of his writings, and also his delightful 'Legend of Sleepy Hollow.' Fenimore Cooper (q.v.) (1789-1851) passed a part of his boyhood among the Red Indians, and what he saw sank

deeply into his mind, to serve as inspiration for his novels. Among them may be named *The Last of the Mohicans*, 1826; *The Pathfinder*, 1840; and *The Deerslayer*, 1841. Though his writing is unequal, he possessed the highest narrative gifts. Wm Cullen Bryant (1794-1878) was one of the earliest of America's poets. The work of his mature years is distinctively American in its subject-matter and individual in its treatment. He had fine descriptive powers, although he never fully realised the promise he gave in *Thanatopsis*, 1817, his finest and best-known poem. Edgar Allan Poe (q.v.) (1809-49) is famous both as poet and as writer of short stories. His influence on the short story may be compared with that of Turgenev or Dickens on the novel. His tales include *MS. Found in a Bottle*, 1831; *The Fall of the House of Usher*, 1839; and *Tales of the Grotesque and Arabesque*, 1840; these are the products of a prodigal imagination. His poems are distinguished by charm of melody, power of lyric expression, and a command of lyric form. One of the best known abroad of America's poets is Henry Wadsworth Longfellow (q.v.) (1807-82). Among his early vols. of verse were *Voices of the Night*, 1839; *Evangeline*, 1847; *The Golden Legend*, 1851; *Hiawatha*, 1855; and *The Courtship of Miles Standish*, 1858; *Tales of a Wayside Inn* was pub. in 1863 and a trans. of Dante in 1865-7. Longfellow had a rare command of metre, and his metrical effects are often striking. Hardly inferior to Longfellow's are the poems of John Greenleaf Whittier (q.v.) (1807-92), the Quaker poet. His early vols. include *Lays of My Home*, 1843; *Songs of Labour*, 1850; and *The Panorama*, 1856. *Snow-Bound*, 1866, with its descriptive vividness and felicity of phrase, is his masterpiece. Longfellow was succeeded as prof. at Harvard by James Russell Lowell (q.v.) (1819-91), who had early dedicated himself to poetry, and who in 1841 pub. *A Year's Life*. In 1848 came *The Vision of Sir Launfal*, and in the same year appeared *The Biglow Papers*. His poetry shows a strong reforming and ethical bias. Lowell is also an essayist of great distinction. Another writer of both verse and prose is Oliver Wendell Holmes (q.v.) (1809-94). The works of Holmes most widely read are the Breakfast Table series: *The Autocrat*, 1858; *The Professor*, 1860; and *The Poet*, 1872. He also wrote some novels, and many poems are included in his vols. of essays. His essays have a lively humour, powers of keen satire, tenderness, and grace; his poems have a graceful charm, the best known being 'The Chambered Nautilus' and 'The Lost Leaf.'

The original genius of R. W. Emerson (1803-82) was a powerful force in the hist. of 19th-cent. thought and literature. His first pub. of note was *Nature*, 1836, which was not well received by the public, but the value of which was clearly seen by Carlyle. His chief works are *Essays* (2 series), 1841 and 1844; *Representative Men*, 1850; *English Traits*, 1856; *The Conduct of Life*, 1860; *Society and Solitude*, 1870; and a vol. of poems. His

transcendental philosophy is expressed in a style at once illuminating, arresting, vivid, and impassioned. His message to the ages is implicit in all his work, but is to be found practically complete in the essays on *Nature*, *Self-Reliance*, and *Compensation*. Emerson's friend, H. D. Thoreau (1817-62), ranks inferior only to Emerson as a transcendental writer and thinker. His greatest and best-known work is *Walden, or Life in the Woods*, 1854, but he also wrote other vols. of description and essays such as *A Week on the Concord*, 1849, and *Miscellanies* 1849. His works, reflecting the man, are full of whimsicality, eccentricity, and sudden excursions into philosophical ground, and are pervaded like Emerson's with a strong ethical sense. John Burroughs (1837-1921) may also be mentioned. His 3 great inspirations were Emerson, Walt Whitman, and Matthew Arnold. Burroughs is most significant as a naturalist, and his many books dealing with nature and animal life are full of original observation, and are distinguished by simplicity of style. The most revolutionary figure in A. L. is Walt Whitman (1819-92). It was not till 1855 that his first really great book *Leaves of Grass* appeared. His later poems include *Drum-Taps*, 1865, a record of his work as a nurse in the Civil war. He wrote in prose *Specimen Days in America*, 1882, and *Democratic Vistas*, 1871. Whitman has been called 'the first democrat.' He was supremely conscious of his dignity as the mouthpiece of democracy. His verse is unrhymed and free and has a swinging energy. Other 19th-cent. poets of America are Bayard Taylor (1825-78), who in addition to many fine lyrics made a well-known trans. of Goethe's *Faust*: C. G. Leland (1824-1903), translator of Heine and author of *Hans Breitmann's Ballads*, 1914; and Joaquin Miller (1841-1913), author of *Songs of the Sierras*, 1871. One of the best poets of the S. was Sidney Lanier (1842-81), author of *The Symphony*, 1875. Paul H. Hayne (1830-86) and Henry Timrod (1828-67) were also notable S. lyrists. Now recognised as one of America's greatest poets is Emily Dickinson (1830-86), whose individual poetry is important for its own beauty and as a forerunner of the later poetic movement, Imagism.

Among the really great novelists is Nathaniel Hawthorne (1804-64). His stories were written as interludes in a busy diplomatic career. His greatest works are *The Scarlet Letter*, 1850, *The House of the Seven Gables*, 1851, and *The Marble Faun*, 1860, together with his stories for children. *A Wonder Book*, 1852, and *Tanglewood Tales*, 1853, and his short stories in *Twice-Told Tales*, 1837, and *Mosses from an Old Manse*, 1846. He had a perfect feeling for form and for narrative construction, and is thus in a sense classical, though his prevailing temper is romantic, in his power to feel the glory and beauty of the New England past. By many Herman Melville (1809-91) is considered the greatest Amer. novelist. His *Moby Dick*, 1851, is a great prose epic of the sea, and in *Typee*,

1846, and *Omoo*, 1847, he took the S. Seas for a subject long before they were discovered by any other writer. Though Harriet Beecher Stowe (1811-90) wrote many novels, she is best known by *Uncle Tom's Cabin*, 1851-2. Later great Amer. fiction writers are Bret Harte (1839-1902) and his fellow humorist 'Mark Twain' (Samuel Clemens, 1836-1910), whose *Life on the Mississippi*, 1883, and *The Adventures of Huckleberry Finn*, 1884, are masterpieces. Henry James (1843-1916) is one of the greatest novelists of the second half of the cent., but in his essence he was really more of a European than an Amer. writer. Wm Dean Howells (1837-1920) was the founder and head of the realistic school, paying scrupulous attention to detail, deriving something of its method from the Russians. Mary E. Wilkins (Mrs C. M. Freeman, 1852-1930) was an important member of this group. Frank Norris (1870-1902), who lived to complete only 2 books of his projected trilogy of the 'epic of the wheat,' is one of the most significant of sociological novelists. He has sometimes been compared to Zola, while David Graham Phillips (1867-1911), owing to his comprehensive outlook on Amer. life, has been called the 'American Balzac.' With Norris is often associated Stephen Crane (1871-1900), whose *The Red Badge of Courage*, 1895, estab. the 'naturalism' of the nineties. Thomas Nelson Page (1853-1922) is the author of some striking stories of Virginian life, while George Washington Cable (1844-1925) made Louisiana his own particular field. His *Old Creole Days*, 1879, is one of the outstanding books of short stories by Amer. authors writing on Amer. subjects. Frank Stockton (1834-1902), author of *The Lady or the Tiger?*, 1882, was a master of humorous narrative.

A field in which Americans have been conspicuously successful from the first is the short story (see SHORT STORY). Irving, Hawthorne, Poe, Harte, James, Edith Wharton are masters of international reputation in this medium. Edward Everett Hale (1822-1909) is famous for a single short story, *A Man Without a Country*, 1865. A new school of short-story writers developed in the 20th cent. The founder of this school was 'O. Henry' (Wm Sydney Porter) (1867-1910), who, in *The Four Million*, 1906, and other books wrote of the life of the people, employed the Amer. idiom with much original power, and became one of the outstanding humorists of his time in the art of the short story. Earlier humorists, apart from 'Mark Twain,' are Charles F. Browne ('Artemus Ward,' 1834-67), Henry W. Shaw ('Josh Billings,' 1818-85), and Joel Chandler Harris (1848-1908), the author of the *Uncle Remus* stories, amusing dialect fantasies. The more serious short story of the nineties is represented in the work of Ambrose Bierce (1842-1914). Two important earlier writers who must not be overlooked are Sarah Margaret Fuller (1810-1850) and R. H. Dana (1815-82), author of *Two Years Before the Mast*, 1840.

The naturalistic novel which had been estab. in the nineties through Russian and Fr. influence working through such men as Howells, Norris, and Phillips, who have been mentioned above, survived into the 20th cent. and took the popular form of elemental virility in the novels of Jack London (1876-1916), whose *Call of the Wild* appeared in 1903. Naturalism of a type more in sympathy with humanity is found in the works of Theodore Dreiser (1871-1945), a writer who probes with compassion every detail of human life. A satirist of the effect of modern business life upon the Puritan conscience is Robert Herrick (1868-1938), author of *Waste*, 1924. Satire of social life, but in a lighter vein, is also a characteristic of the work of Booth Tarkington, while of modern novelists the satirist *par excellence* is Sinclair Lewis, who has turned his satire successively on life in the small town (*Main Street*, 1920) or small city (*Cass Timberlane*, 1945), on the business man (*Babbitt*, 1922), on the doctor (*Arrowsmith*, 1925), and on the clergy and revivalist (*Elmer Gantry*, 1927). Chief among the propagandists is Upton Sinclair, whose book, *The Jungle*, appeared in 1906 as a result of his investigation of the Chicago stockyards. A voluminous writer, he set out, in his 10 'Lanny Budd' novels, a cavalcade of world events from 1939 to 1952. Allied with him in what may be called 'sociological criticism' are Randolph Bourne (1886-1918), Van Wyck Brooks, Ludwig Lewisohn, and R. M. Lovett. Sherwood Anderson (1876-1941) was more a master of the short story than the novel, and he and Willa Cather share with Dreiser, Edith Wharton, and James Branch Cabell the distinction of being the leading Amer. novelists in the twenties. Another romanticist, but one who escapes from life into his colourful background, is Joseph Hergesheimer. Escape from realism is also found in the romances of Donn Byrne (1889-1928), and the more sophisticated type of romance, *The Bridge of San Luis Rey*, 1927, by Thornton Wilder. Another novelist of greater psychological penetration is Susan Glaspell, while in contrast is the terse style and vivid realism of Ernest Hemingway. Novelists equally competent are John Dos Passos, Louis Bromfield, Thomas Wolfe (1900-38), and Glenway Westcott. The vogue of fiction after the First World War produced many writers of varying and distinctive merit. Among them may be mentioned Gertrude Stein, remarkable for new experiments in both prose and poetry, and Wm Faulkner and Pearl Buck, who share with Sinclair Lewis the distinction of being Nobel prize-winners. The trend away from individualism and towards social consciousness is exemplified in *The Grapes of Wrath*, 1929, by John Steinbeck, and *Tobacco Road*, 1932, by Erskine Caldwell. Margaret Mitchell's monumental *Gone with the Wind*, 1936, was the finest of a series of epic novels dealing with the Civil war period.

Enduring work has been done in the essay by Henry Brooks Adams (1838-1918) and Woodrow Wilson (1856-1923),

and in philosophy by 2 writers of lasting influence and distinctive style: Wm James (1842-1910) and George Santayana. In literary criticism the flourishing condition of creative literature has produced many controversies, the main conflict being between the 'humanistic' and the naturalistic attitudes to life. The former was maintained by the 'conservatives'—Paul Elmer More, George Woodberry, J. J. Chapman, H. S. Canby, Irving Babbitt, and Stuart Sherman. On the naturalistic side are John Macy (1877-1932), Van Wyck Brooks, Ernest Boyd, and H. L. Mencken. The latter through *The American Mercury*, of which he was editor, wielded a powerful and salutary influence over Amer. life and letters. His championship of Dreiser and Cabell against unintelligent criticisms placed A. L. in his debt. Another critic of importance in setting standards of taste was W. C. Brownell (1851-1928), while personal and impressionistic criticism is exemplified by James G. Huneker (1860-1921) and G. J. Nathan. Historical criticism treating of nationalism as an asset in literature was exemplified in *The Irresponsibles*, 1940, by Archibald Macleish, and *What is Primary Literature*, 1941, by Van Wyck Brooks, author also of the monumental 5-vol. conspectus of Amer. writers from 1800 to 1915, entitled *Makers and Finders*, 1945-52.

Twentieth-century Poetry. The beginning of the cent. was marked by a poetic renaissance. The movement had been begun by Whitman, furthered by Hovey and the Canadian Carman, and continued by Edwin Markham (1852-1940), famous for his poem 'The Man with the Hoe'; and by Wm Vaughn Moody (1869-1910). In Oct. 1912 the first number of *Poetry*, a Magazine of Verse appeared. It was ed. by Harriet Monroe, and was an anthology of the 'new' poetry of the better Amer. poets of the 20th cent. Lee Masters with his *Spoon River Anthology*, 1915, scored the most phenomenal success, but his method of brief and acid portraits was anticipated by E. A. Robinson, a poet whose chief theme is the pathos of frustration. An interpreter of another aspect of Amer. life is Carl Sandburg, whose *Chicago Poems* appeared in 1916. The characteristic of these poets is their determined use of everyday speech, and a professed 'people's poet' is Vachel Lindsay (1879-1931). He and Sandburg, both poets of the Middle W., derived from Whitman. The Imagist movement was launched by Ezra Pound, a cosmopolitan poet who found much of his inspiration in Provencal and Chinese literature. The first declaration of Imagism in America was *Some Imagist Poets*, 1915, ed. by Amy Lowell (1874-1925), one of the most successful writers in free verse. Other Amer. poets who were Imagists were John Gould Fletcher and 'H.D.' (Hilda Doolittle). Conrad Aiken, a metaphysical, attached himself for a short time to the movement, while other successful exponents of free verse were Maxwell Bodenheim and Alfred Kreymborg. T. S. Eliot (q.v.), whose *Waste Land* was first pub. in

England in 1922 and then appeared in the Amer. magazine *Dial*, became the leader of poetic experimenters in England and America, and an outstanding figure among modern poets. With T. S. Eliot the influence of Laforgue and the Fr. Symbolists was evident in A. L., an influence equally apparent in younger poets of the period, including Hart Crane (1899-1932), whose poem *The Bridge* appeared in 1930, Malcolm Cowley, and Archibald MacLeish. The 2 last-named have also won a considerable reputation as critics. Allen Tate was a poet of the intellectual school, deriving from T. S. Eliot. He, with John Crowe Ransom and Robert Penn Warren, formed a group which became known through their magazine, *The Fugitive*, 1922-5. Narrative verse found a powerful exponent in Robinson Jeffers, whose *Tamar* appeared in 1924. Wallace Stevens is another important poet of the period. His first book *Harmonium*, of luxurious and eloquent poetry, did not appear until 1923, although he had been a discoverer of the 'new' Poetry anthology of 1912. He is an artist of great sensibility who reached maturity with *Ideas of Order*, 1935, and *The Man with the Blue Guitar*, 1937. Robert Lee Frost's finest poetry is descriptive, and gives vivid pictures of the countryside of New England. Among his pubs. are *The Lovely Shall be Choosers*, 1929, and *A Witness Tree*, 1943. The poetic renaissance in America between the wars was indeed remarkable, nor must the contribution of Negro poets be forgotten, headed by P. L. Dunbar (1872-1916), and including James Weldon Johnson (1871-1938) and the gifted Countee Cullen (see also NEGROES). More recently a stimulus towards the better appreciation of poetry was given by the personal vogue of the Welsh poet Dylan Thomas (1914-53), through the readings that he gave during his visits to the U.S.A.

See also DRAMA, *American Drama*.

See *Cambridge History of American Literature* (4 vols.), 1917-21; L. Untermeyer, *American Poetry Since 1900*, 1924; E. E. Leissey, *American Literature*, 1929; C. Angoff, *A Literary History of the American Peoples*, 1931; J. W. Krutch, *The American Drama Since 1918*, 1939; F. B. Millet, *Contemporary American Authors*, 1940; W. S. Maugham, *Introduction to Modern English and American Literature*, 1943; H. Straumann, *Modern American Literature*, 1943; Van Wyck Brooks, *Makers and Finders* (5 vols.), 1945-1952; H. Gregory and M. Zaturenska, *A History of American Poetry 1900-40*, 1946; R. Spiller (ed.), *Literary History of the United States* (3 vols.), 1948; Van Wyck Brooks and Otto Bettmann, *A Pictorial History of American Literature*, 1956; J. D. Hart (ed.), *The Oxford Companion to American Literature* (revised ed.), 1956.

American Music. The hist. of Amer. composed music, in the narrower sense of the music of the U.S.A. (as distinct from the multiplicity of forms of folk music), dates only from the 18th cent. The first native composer is often considered to be Wm Billings (1746-1800), whose

settings of psalms contain fierce and unsubtle music. He also wrote patriotic songs for the War of Independence; he d. a pauper in Boston. Billings's reputation as the first Amer. composer is challenged by John Antes (b. 1740 in Pennsylvania), the Ger.-born Conrad Belsess (said to have contributed 1000 hymns to Franklin's *Ephrata* collection, 1730), and Wm Tuckey (1708-81). Another claimant is Francis Hopkinson (1737-91), the first secretary of the navy, poet, essayist, inventor, and painter. His cantata, *The Temple of Minerva*, 1781, may be called the first Amer. opera. James Hewitt's *Tammany*, 1794, contains the first music said to be based on Amerindian (Cherokee) melodies. Thus it is seen that the U.S.A. was producing a small amount of music for itself even before the musically important year of 1825, when the Garcia company introduced It. Grand Opera to New York. The 1840's and '50's were most noted for the popularity of the minstrel show. Outstanding in this field is the composer Stephen Foster (q.v.), one of the founders of the present-day U.S. supremacy in the popular song industry. The renown of popular song writers, such as Cole Porter, Jerome Kern, and Irving Berlin, contrasts with the undistinguished series of Amer. operas performed at the Metropolitan Opera House, New York. These began in 1910 with Converse's *Pipe of Desire*, and the more successful include Deems Taylor's *Peter Ibbetson*, 1931, and Parker's *Mona*, 1912. As far as symphonic music is concerned, no more than a handful of U.S. composers have become known to a large public, but a vast number of composers b. round the turn of the 20th cent. are writing serious instrumental and vocal concert music. Success within the U.S.A. has been largely dependent on the number of first-class orchestras; thus, the founding of the New York Philharmonic (1842), the Boston Symphony (1881), the Chicago Symphony (1891), and other orchestras coincided with the first symphonic composers, many of whom are now almost forgotten. The *Oedipus Tyrannus* of John Knowles Paine (1839-1906) was performed 17 years after his death; but his best achievement was really the success of his composer pupils, Daniel Gregory Mason, Frederick S. Converse, Arthur Foote, and John Alden Carpenter. Others of his pupils formed the so-called New England School, in which were found many of the foremost 20th-cent. composers, e.g. George W. Chadwick and Horatio Parker. Perhaps the foremost of all was Edward MacDowell (1861-1908); he has become a criterion for good modern Amer. music—though not for the so-called modernists, who form no integrated group, being each intensely individual. The most notable are Aaron Copland, Roy Harris, Samuel Barber, Roger Sessions, Paul Creston, and Walter Piston.

Folk Music and its Modern Derivatives. The true Amer. folk music is obviously the music of the Amerindian races. Important research has been done by such men and women as Theodore Baker, Alice

Cunningham Fletcher, Frederick Burton, and Frances Desmore, who have noticed similarities to Russian and Chinese folk music. Amerindian music, however, is very primitive and a thing apart, having had very little influence on composers, or on the other types of folk music. These other types have sprung from the same sources of the pop. of the U.S.A., and are just as varied. Minority groups of folk music exist, as the Scandinavian in the N.W., the Ger. in Pennsylvania, the Sp. of California and the Mexican border, and so on; but the two great origins of U.S. folk music and its derivatives are the heritages of the Brit. emigrants and of the Negro slaves. First, the old songs and ballads of England, Scotland, and Ireland were brought with the settlers to the Atlantic coast, whence they spread slowly inland. In the Appalachian Mts they found ideal conditions for preservation, so that in many cases old songs forgotten in Britain have been found still flourishing there. The Brit. songs also formed the basis for a tremendous variety of pioneer songs. Similarly, the greater part of the Amer. country dances are of Brit. origin (e.g. the Virginia Reel is almost identical with Sir Roger de Coverley). The second major root is that of the African Negro music, together with the Creole. The religious songs (spirituals) of the Negro (see NEGRO SPIRITUALS) took the fancy of the white pops. during the 19th cent., resulting in the pseudo-spirituals, minstrel and 'coon' songs, which, mingling with the white tradition, produced 'ragtime' (q.v.). This reached its peak about 1910, when it combined with the 'blues' (Negro songs of lamentation) to form jazz (q.v.). After the First World War 3 styles of music developed: blues, jazz, and swing. The decade following the Second World War witnessed further development in 'hot' music, the popularity of which was enormously increased by improved methods of television, radio, and high fidelity gramophone diffusion. See H. C. Lahee, *Annals of Music in America*, 1922; L. C. Elson, *History of American Music* (revised ed.), 1925; E. E. Hipsher, *American Opera and its Composers*, 1927; W. T. Upton, *Art-Song in America*, 1930, 1938; J. T. Howard, *Our Contemporary Composers*, 1941, and *Our American Music, Three Hundred Years of it* (revised ed.), 1955; I. Kolodin, *The Story of the Metropolitan Opera*, 1953; G. Chase, *America's Music*, 1955.

American Planning and Civic Association was formed in 1935 through the merger of the Amer. Civic Association, organised in 1904, and the National Conference on City Planning, organised in 1909. It is dedicated to the education of the Amer. people to an understanding and appreciation of local, state, regional, and national planning for the best use of urb. and rural land, and of water and other natural resources; the safeguarding and planned use of national parks; the wise management of national and state forests; the conservation of natural scenery; the improvement of living conditions; and the fostering of wider educational facilities in

schools and colleges in the fields of planning and conservation. The association publishes the *American Planning and Civic Annual* and a quarterly, *Planning and Civic Comment*. The National Conference on State Parks, originating in the office of the A. P. and C. A., and organised in 1921, endeavours to inform the public, through a central clearing house of information, pubs., conferences, and by other educational means, of the value of state parks, monuments, historic sites, and other types of area suitable for recreation, study of hist., natural hist., and science, preservation of wild life, and conservation of natural scenery and cultural resources through the estab. and operation of well-balanced state park systems. It issues *Park Practice*, *Grist*, and a *Yearbook of Park and Recreation Progress*.

American Scenic and Historic Preservation Society, founded by Andrew H. Green, and incorporated 1895, for the protection of natural scenery, the preservation of historic landmarks, and the improvement of cities.

American War of Independence, see UNITED STATES OF AMERICA, History.

Americanism, word or phrase originating among the people of the U.S.A., and obtaining general currency there. Some so-called A.s are merely Eng. words which have had applied to them a different meaning from that in use in England. For instance, 'corn' in America is applied only to Indian maize, whereas in Great Britain it is applied to all cereals. Some other A.s are of perfectly good Eng. origin, but have dropped out of current usage in Great Britain. Where Eng. people use the word 'autumn,' of Lat. origin, Americans commonly use the old pure Eng. word 'fall,' which is at once more apt and more poetic—the time of the fall of the year, the time when the leaves fall. Similarly, Americans say 'guess' for 'think,' 'hefty' for 'sturdy' or 'stalwart,' 'fetch' for 'bring.'

In another sense A.s reveal the story of the colonisation of the ter. that is now the U.S.A. by various European nations, and also of the relics of the native Amer. Indians whom they dispossessed. Thus of Indian origin are such common words as 'canoe,' 'hominny,' 'tomahawk,' 'pemmican,' 'toboggan,' 'pow-wow,' 'wigwam,' and the very expressive Eng. word the Indians invented to describe whisky, 'fire-water.' Traces of Fr. colonisation in the U.S.A. are shown by words like 'prairie' and 'bayou.' The Spaniards left their mark in words like 'mustang,' 'adobe,' 'canyon,' 'mesa.' But most A.s are of purely Amer. origin, growing out of the life of the people, their business, their politics, which are different from those in England. Amer. trade has altered the stereotyped vocabulary by a system of curtailed words, or words illustrating new methods of commerce. Americans have decided inventive genius, and have been just as skilful in creating new names for their new discoveries. The number of patented articles in America is enormous, and many of these have their own made-up names which

have passed into current usage. There are many A.s which originated as mere slang expressions, then became generally current in America, and finally secured a place even in the Eng. language as spoken in Great Britain. Such are, for instance, 'boodle' for money obtained illegally, particularly by politicians; 'bunkum (q.v.) platform' for a political party programme; 'plank' for an important section of that programme. The prohibition law in America, and the consequent successful attempts to evade it gave rise to a whole series of new words. Thus 'blind tiger' meant a place where alcoholic liquor was sold despite the law; 'bootlegger' was a man who made a profession of selling liquor illegally; 'hooch' was the name generally given to the stuff that was sold as whisky in the U.S.A. after prohibition came into force.

There are many A.s which are to-day in the transitional stage. Now they are mere slang. To-morrow they may be universally adopted or drop out entirely. The origin of many of these is obvious. Thus 'also ran' means an unsuccessful contestant, evidently adapted from the racecourse term. 'Boll-weevil,' from being the name of a pest that destroys the cotton plant, has evolved into a term for any obnoxious person. 'Tight-wad' means a stingy person, obviously because he keeps his wad of paper money unspent. 'Gold-digger' originated in the Broadway theatrical dist. of New York City. It originally meant a chorus girl who wheedled money and presents out of male admirers. It now means any woman who does the same. 'Hen-party' obviously means a party composed entirely of women. 'Muck-rake' (which comes from *Pilgrim's Progress*) to the agile Amer. mind quite obviously suggested obtaining secret and unsavoury data about institutions and public officials. 'Ritzzy' is a perfect laboratory example of how Amer. slang originates. At one time in America the Ritz hotels were supposed to be the last extreme of luxury and also of costliness. People who stopped at such hotels were supposed to be wealthy, and very likely to be snobs. Hence the word 'Ritzzy' means 'giving oneself airs'. The origin of other A.s is not obvious, and their life is also one of dubious duration. Thus 'apple sauce' for empty talk; 'fall guy' for one who is made a tool of; 'fahend' for a stupid person (dates from 1842); 'make whoopee' for making unbridled and drunken revelry. There was a time when most A.s were confined to America and known only there. But with the spread of both the Amer. silent and talking films, the average Eng. audience has picked them up and the younger people have at times adopted them. Amer. slang may often shock the purists. Some of it is coarse and some of it cheap. But it is in one way a sign that the Americans are in process of creating for themselves a language which steadily tends to differ from that spoken in Great Britain, not only by inventing new expressions, but also by

giving the old ones new twists applicable to a different continent. The same thing is observable among the Sp.-speaking peoples of S. America, where the language tends to differ from that spoken in Spain. See G. P. Krapp, *The English Language in America*, 1925; H. L. Mencken, *The American Language*, 1936 (with supplements, 1945, 1948); W. A. Craigie and J. R. Hulbert, *A Dictionary of American English*, 1938-44; S. Robertson and F. C. Cassidy, *The Development of Modern English*, 1955.

America's Cup, The, silver cup given, in 1851, by the Royal Yacht Squadron for a race for any yachts at Cowes, Isle of Wight. There were 15 competitors and it was won by an Amer. yacht called the *America*, of 150 tons. It was given to the New York Yacht Club by the surviving owner in 1887, and is offered as an international prize to any yacht-owner of another nation who can win it under conditions laid down in the Deed of Gift. Many unsuccessful attempts have been made by Brit. yacht-owners in Amer. waters to bring the trophy back to England. Sir Thomas Lipton built and raced no fewer than 5 yachts. His *Shamrock IV* was beaten in 1920 and after 10 years' interval *Shamrock V* failed in 1930. *Endeavour* (T. O. M. Sopwith) lost to *Rainbow*, 1934; *Endeavour II* (T. O. M. Sopwith) lost to *Ranger* in 1937. By a recent amendment to the 1887 Deed of Gift, vessels competing for the cup are no longer required to sail to the port where the race is to take place. Largely as a result of this and other changes in the originally rather severe conditions, another Brit. challenge was made in 1957 for a contest in the autumn of the following year.

Americium, see TRANSURANIC ELEMENTS.

Americus, co. seat of Sumter co., Georgia, U.S.A. It manufs. cotton-seed oil, clothing, stoves, lumber, and boxes, and has food canning and peanut processing. Pop. 11,389.

Amerigo Vespucci, see VESPUCCI.

Amerling, Friedrich von (1803-87). Austrian painter, b. Vienna. His portrait of the Emperor Francis I, 1832, made him celebrated in his country.

Amerongen, vil. in the prov. of Utrecht, Netherlands. The ex-Kaiser William II of Germany fled to the castle of A., seat of Count Goddard Bentinck, 10 Nov. 1918.

Amersfoort, tn in the prov. of Utrecht, Netherlands, 13 m. NE. of the city of Utrecht. It is an old tn, retaining many of its medieval characteristics; its walls still stand in places. The Koppelpoort, a crenellated gateway with bridge and water-port, is one of the most picturesque gateways in the Netherlands. A church tower built in 1441, 312 ft high, contains a carillon of 35 bells. Main manufs. are tobacco and woollen goods. Pop. (1954) 63,638.

Amersham, mrkt tn of Bucks, England, 7½ m. ENE. of Wycombe. Prin. industries are cosmetics, textile printing, bacon, pie, and cooked meat production, and timber haulage. Edmund Waller, the

poet, was b. at Colleshill (2 m.). Pop. 11,292.

Amery, Leopold Charles Maurice Stennett (1873-1955), Brit. politician and publicist, b. India, and educ. at Harrow and Balliol College, Oxford. He organised *The Times* war correspondence in S. Africa (1898-1900), and wrote *The Times History of the S. African War* (7 vols.), which was completed in 1909. He was elected to Parliament as a Conservative, 1911. In the First World War A. was assistant secretary of the War Cabinet in 1917 and on the staff of the War Council at Versailles in 1917-18. He was First Lord of the Admiralty in 1922 and afterwards, in Baldwin's administration, secretary of state of the dominions and colonies, in which capacity he twice presided over the Imperial Conference. As secretary of state for India in Churchill's Cabinet (1940-5) it fell to him to formulate a plan for Indian self-gov. He was defeated at the General Election of 1945 and after that devoted himself to lecturing and writing on imperial and constitutional affairs. Pubs. include: *The German Colonial Claim*, 1939; various collected speeches and lectures on imperial affairs and the constitution; *India and Freedom*, 1942; and, autobiographical, *My Political Life* (3 vols.), 1953-5.

A.'s son, **Julian A.** (1919-), educ. at Eton and Oxford, has been a Conservative M.P. since 1950. He was one of the leaders of the 'Suez Group' in 1956; in Macmillan's gov., 1957, he became parl. under-secretary at the War Office.

Ames, Fisher (1758-1808), Amer. orator, b. Dedham, Massachusetts. After graduating from Harvard in 1774, he practised law and became famous for his articles on Shay's rebellion. Elected to Congress, 1788, he later served on the Massachusetts Council. His works were pub. by Seth A., his son, in 1809.

Ames, Joseph (1689-1759), bibliographer and antiquarian, b. at Great Yarmouth. The nature of his trade is doubtful, but it was lucrative. A., at the suggestion of the Rev. John Lewis of Margate, undertook to write a hist. of printing in England from 1471 to 1600—his famous *Typographical Antiquities*. To facilitate his research he circulated a preliminary list of 215 Eng. printers with a request for information concerning their lives and work. This book is of great value to bibliographers. It was pub. in 1749.

Ames, Joseph (1816-72), Amer. painter, b. New Hampshire, U.S.A., d. New York. He was self-educ., but made enough by portrait painting to study in Rome, where he painted a fine portrait of Pius IX. He earned fame also for his portraits of Emerson, Ristori, Prescott, Cornelius Felton, and Rachel. Of his historical paintings the best known are 'The Death of Webster' and 'Maud Muller.'

Ames, William (1576-1633), Puritan divine, b. Ipswich. At Christ's College, Cambridge, he came into conflict with the authorities for his nonconformity and denunciations of univ. life. He fled to Holland and, clothed as a fisherman,

resumed preaching. At the synod of Dort he was the most active and influential of the foreign divines. Installed as pastor at Franeker (1622) he won renown as prof., preacher, and theologian. In 1639 through ill health he accepted a charge at Rotterdam, where he wrote *De conscientia et ejus jure vel casibus* (*Fresh Suit against Ceremonies*), 1630, a book which connected Christianity with the common things of life, and won Richard Baxter over to the nonconformists.

Ames, city in Iowa, U.S.A., 30 m. N. of Des Moines. It manufs. hats, laboratory aprons, metal products, etc., and is the seat of Iowa State College of Agriculture and Mechanic Arts and its Institute for Atomic Research. Pop. 22,900.

Amesbury, small tn in Wilts, England. St Mary's Church is of Early Eng. architecture. Near the tn is A. Abbey, the old residence of the dukes of Queensberry, which was built by Inigo Jones. Stonehenge and a rampart of the Rom. period are also near by. Here was erected in 980 the nunnery of Ethelfrida, wife of King Edgar. Pop. 3500.

Amethyst, species of quartz characterised by its beautiful violet, purple, or blue shades. According to the popular etymology, the word comes from the Gk α, privative, *methusheim*, to intoxicate, the stone having the supposed virtue of warding off intoxication. The violet colour is said to be due to the presence of manganese, but modern chem. inclines to discredit this. A tinged quartz has a wide distribution, but pure A. is confined to a comparatively small area—India and Ceylon chiefly. A. is found in Scotland and is one of the most popular stones in old Scottish jewellery.

Amharic, language of the inhab. of Amhara, the central prov. of Ethiopia, and the official language of Ethiopia. The earliest extant poems belong to the 14th and 15th cent. AD. It is a descendant of the old Semitic tongue known as Ethiopic or Ge'ez.

Amherst, Jeffrey, Baron (1717-97), b. Riverhead, Kent. Through the influence of the Duke of Dorset he obtained an ensigncy in the Guards. His career was brilliant, and in 1758 he became Commander-in-Chief of the Brit. forces in N. America. To him more than anyone else is due the success of Brit. arms on that continent during the Seven Years War. He was raised to the peerage in 1776, and became field marshal in 1796.

Amherst, William Pitt Amherst, Earl (1773-1857), Brit. diplomat. He was sent on an embassy to China (1816) in order to procure better terms for commerce between China and Great Britain, but through his spirited refusal to perform the 'kow-tow' to the emperor his embassy failed. In 1823 he was made Governor-General of India, holding this office till the year 1828. He conducted the first Burmese war with great success, and was awarded the earldom of Arakan. See A. T. Ritchie and R. Evans, *Lord Amherst and the Advance to Burma*, 1894.

Amherst: 1. VII. about 30 m. S. of

Moulmein in Lower Burma, founded by the British in 1826 and named after the then Governor-General of India, but now merely a fishing vil. and bathing-place for Moulmein.

2. Tn in Hampshire co., W. central Massachusetts, U.S.A., seat of A. College and the Univ. of Massachusetts. The poet Emily Dickinson was b., lived, and d. in A. Pop. 10,600.

3. Co. tn of Cumberland co., Nova Scotia, Canada, a manufacturing centre surrounded by fine farming lands reclaimed from the marsh. Pop. 9870.

Amherstburg, tn in Ontario, Canada, on the N. shore of Lake Erie. It has a good harbour and does a considerable trade in timber. Pop. 4014.

Amianthus (Gk *amiantos*, undefiled), a white variety of asbestos (q.v.).

Amice (Lat. *amicus*, a wrap), eccles. vestment—an oblong piece of linen tied round the neck under the alb. It was originally worn like a hood over the head, sometimes ornamented with an apparel, and thrown back like a cowl.

Amicis, Edmondo de (1846–1908). It. novelist, essayist, and writer of travel books, disciple of Manzoni. Although he lacked the latter's powerful creative imagination, his style is versatile and his descriptions skilful. He excelled in short stories. His main works are *La vita militare*, 1868, *Novelle*, 1872, *La Spagna*, 1873, *Constantinopoli*, 1877, *Il Cuore*, 1886, and *Sull' Oceano*, 1889. See B. Croce, *La Letteratura della Nuova Italia*, 1, 1929, and G. Mazzoni, 'L'Opera de E. de Amicis,' in *Nuova Antologia*, 1932.

Amicus Curiae (Lat., 'friend of the court'), legal term denoting a disinterested person, who, at the hearing of a case, informs or corrects the court.

Amides, see ACID-AMIDES.

Amidines, organic compounds corresponding to the formula



where R is a radical. They may be regarded as being derived from the acid-amides by replacing the oxygen by the group NH. They may be prepared by the combination of nitriles with ammonia and primary amines. The chief A. are *formamidine*, *acetamidine*, and *benzamidine*.

Amiel, Henri Frédéric (1821–81), Swiss philosopher, b. Geneva. In 1841 he became prof. of aesthetics, and afterwards of moral philosophy, at the Geneva Academy. A. is best known as the author of *Journal Intime* (2 vols., 1882–4), an introspective work of which there is an Eng. trans. by Mrs Humphrey Ward (1885).

Amiens (Lat. *Ambianum*), Fr. tn, cap. of the dept of Somme, situated at the confluence of the Somme and the Arve, 81 m. from Paris. It was the anct cap.

of Picardy, and is on the site of Samarobriva, cap. of the Ambiani, from whom the name A. is probably derived. The county of A. was joined to the Fr. crown at the end of the 12th cent. In 1264 the Provisions of Oxford (see under PROVISION) were placed under the arbitration of Louis IX (St Louis) at A., who decided in favour of Henry III and against Simon de Montfort and the barons; this episode, the 'Mise of A.,' led to war in England. In 1802, by the Peace of A., the claims of England, France, Spain, and Holland were settled: Britain acknowledged the new position of France in Europe, and agreed to give up her late conquests, excepting Ceylon, captured from Holland in 1796, and Trinidad, taken from Spain in 1797, and to restore Malta to the Knights of St John (see under FRANCE, History). The chief glory of the tn is the cathedral of Notre Dame, dating from the 13th cent., styled by Viollet-le-Duc 'the Parthenon of Gothic architecture.' It is the largest church in France, and has a wealth of magnificent medieval sculpture. A. suffered severely in both world wars, particularly in the second, but its finest buildings escaped irreparable damage. There are considerable manufs. of textiles, velvet, silk, woollen, and cotton goods; there are engineering works, food processing plants, and the tn is a famous market gardening centre. Peter the Hermit, Du Cange, Gresset, Delambre, and Bourget (qq.v.) were natives of A. Pop. 85,000.

Amiens, Battles of. A. was often threatened but never taken by the Germans in the First World War. In the second battle of the Somme (1918) it was the main object of the enemy to reach the city. On the sixth day of the battle (26 Mar.) the danger of the Germans reaching the city and driving a wedge between the Brit. and Fr. armies was very real. But the Germans could not sustain the momentum of their attack and were exhausted by the protracted and stubborn resistance of the allied armies under Foch's supreme command. On 24 April the Germans made a last attempt to break through to A., and for a short time were actually in possession of Villers-Bretonneux only 9 m. to the E. But the Brit. Fourth Army, under Gen. Rawlinson, who had been put in command on the A. front on 28 Mar., brilliantly counter-attacked on 24 April, recaptured Villers-Bretonneux, and so closed the gate to A. In the following Aug., after Foch had assumed the offensive, Haig attacked the enemy on the A. front (8 Aug.). Two thousand guns opened the bombardment almost simultaneously. Tanks, followed by the assaulting troops, burst through the Ger. lines in one irresistible torrent. Demoralisation spread in the Ger. ranks, and by 10 Aug. the dominion troops, aided by the Cavalry Corps, had pierced the Ger. lines to a depth of 12 m. Ludendorff himself said that '8 Aug. was the black day in the hist. of the Ger. Army.' In the Second World War A. fell to the Germans in the early summer of 1940,

at which time, and afterwards, considerable damage was done to the city. It was liberated by the Brit. 21st Army Group at the end of Aug. 1944. For First World War see A. Kearsey, *The Battle of Amiens, 1918, 1950*.

Amiens, Mise of, see AMIENS.

Amiloar, see HAMILCAR.

Amines, organic substances formed by the replacement of one or more of the hydrogen atoms of ammonia by an equivalent number of univalent organic radicals, such as alkyl groups (q.v.) or those derived from benzene, e.g. phenyl, C_6H_5 , groups. They are divided into primary, secondary, and tertiary A. according to the number of hydrogen atoms displaced by radicals. Primary A. are methylamine, $NH_2 \cdot CH_3$, ethylamine, $NH_2 \cdot C_2H_5$, etc.; secondary A. are dimethylamine, $NH(CH_3)_2$, diethylamine, $NH(C_2H_5)_2$, etc.; and tertiary A. are trimethylamine, $N(CH_3)_3$, triethylamine, $N(C_2H_5)_3$, etc. Among the aromatic A., aniline or phenylamine, $C_6H_5 \cdot NH_2$, is the most important.

Aliphatic A. are formed when an alcoholic or aqueous solution of ammonia is heated with an alkyl halide, the alkyl group taking the place of 1 atom of hydrogen in the ammonia. When excess of ammonia is employed all 3 A. are formed, but it is often possible by adjusting the proportion of ammonia and the time of the action to obtain a given amine as the main product, whence usually by fractional distillation the smaller quantities of the others can be eliminated. The 3 A. may be distinguished by their behaviour towards nitrous acid, primary A. yielding alcohols with evolution of nitrogen, secondary A. yielding yellowish liquids called nitrosoamines, whilst tertiary A. are unacted upon or oxidised. Aromatic A. are prepared by the reduction of nitro-compounds; thus nitrobenzene, $C_6H_5 \cdot NO_2$, yields aniline on reduction with tin and hydrochloric acid.

The lower aliphatic A. are inflammable gases, very soluble in water; and the higher members are liquids with low boiling points, and are miscible with water. Many have a curious odour of boiled lobster. Methylamine occurs in 'perennial mercury,' and dimethylamine and trimethylamine are constituents of herring-brine. Many of the very poisonous ptomaines (e.g. *putrescine* and *cadaverine*) are A. Aniline (q.v.), toluidine, and benzidine are among the chief aromatic A. Many aromatic primary A. are used in the preparation of azo-dyes.

Aminoisocaproic Acid, see LEUCINE.

Amino-Naphthalene, see NAPHTHYLAMINE.

Amiot, Père Joseph (1718-94), learned Fr. Jesuit, b. Toulon and d. Peking. He was sent as a missionary to China, and arrived at Macao, 1750, and at Peking, 1751, where he lived until his death. His knowledge of Chinese and Tatar languages allowed him to interpret many obscure passages in the Chinese writers, and his works contain valuable information

on China and Chinese literature, arts, and hist. Among them are *Art militaire des Chinois*, 1772, *Vie de Confucius*, 1791, and *Dictionnaire Tartare-Manchou-Français*, 1789-90.

Amir, see EMIR.

Amirante Islands, i.e. Admiral Is., named after Vasco da Gama, their discoverer, a group in the Indian Ocean, SW. of Seychelles, in lat. $5^\circ S.$, long. $53^\circ E.$ They are owned by Great Britain as a dependency of Seychelles. The scanty pop. supports itself by fishing.

Amisia, see EMS.

Amissus, see SAMSUN.

Amitemnum, see L'AQUILA.

Amliwch, seaside resort on the N. coast of Anglesey, Wales, with an old harbour. Bromine is extracted from sea-water. Pop. 3020.

Amman, Johann Konrad (1663-1730), Swiss physician, b. Schaffhausen, and graduated at Basel in 1687. Began to practise at Amsterdam. An early authority on the teaching of the deaf and dumb, his method being to attract the attention of his pupils to the motions of the lips and larynx, and then to urge them to imitate these movements. His great work, *Surdus Loquens*, was pub. in 1692. He d. Warmoud, near Leyden.

Amman, Jost (1539-91), Swiss painter and engraver, b. Zürich. His productions are extremely numerous, but he is most remarkable for his engravings on wood. His original drawings are chiefly to be found at the Berlin Museum.

Amman (biblical **Rabbath Ammon**), cap. of the Hashemite Kingdom of Jordan, 50 m. ENE. of Jerusalem. Modern A. has developed since the turn of the cent. on the site of a small Circassian vil. scattered over the ruins of a Græco-Rom. city famous for its well-preserved Rom. theatre, Es-Salt, the old cap., gave place to A. largely because the latter, being on the Hejaz railway, was a more natural centre for trade and communications. After the First World War A. became the H.Q. of the British and of the Emir Abdullah; to-day the city fills 3 neighbouring valleys and encroaches on the surrounding hills. On the plateau E. of A. is an air station; formerly a Brit. R.A.F. base, it was delivered to Jordan by agreement in 1957. The city has 3 royal palaces. The pop., which has been much increased by refugees following the Palestine crisis, is c. 250,000.

Ammanati, Bartolomeo (1511-92), Florentine architect and sculptor. He studied under Sansovino, did much work for Pope Julius III, and built the beautiful Ponte della Trinità over the Arno.

Ammanford, tn of Carmarthenshire, Wales, 12 m. from Swansea, with coal-mines and light industries. Pop. 7000.

Ammelide, substance obtained by the hydrolysis of ammeline. It is a white powder, insoluble in water, alcohol, and ether, but soluble by the alkalis and strong acids. Its formula is $C_5H_7N_4O_4$.

Ammeline, substance obtained by the action of hydrochloric acid on melam. It is of a splendid white colour, and is

composed of very fine silky needles; it is insoluble in water, alcohol, and ether, but soluble in the caustic alkalis. When fused with potassium hydroxide, A. is converted into ammonia and potassium cyanate. Its formula is $C_5H_5N_3O$.

Ammeter, instrument for measuring electric current in amperes. A.s are always connected in series in the circuit; a shunt in the instrument ensures that only a small definite fraction of the current flows in the sensitive coil or wire. Moving-coil A.s can only be used on direct current and must be connected as indicated on the + and - terminals. The scale is uniform. Hot-wire and moving-iron A.s can be used on both direct current and alternating current. The scale is not uniform. Dynamometer A.s have a uniform scale and may be used on direct current and alternating current. Rectifier A.s are only suitable for alternating current. See ELECTRIC METERS.

Ammianus Marcellinus (c. AD 330-c. 393), last of the great Rom. historians, b. Antioch in Syria. He served in the E., in Gaul under Constantius II, and later under Julian against the Persians. Settling in Rome some time after 371, he wrote in Latin a hist. of the empire from the accession of Nerva to the death of Valens, covering the period 96-378. Only 18 of 31 books have survived, but they provide most valuable evidence for the years 353-78. Notwithstanding his mediocre style, A. M.'s work is stamped with the soldierly qualities of its author—clarity, broadmindedness, and impartiality. See the text and trans. in Loeb Library and E. A. Thompson, *The Historical Work of Ammianus Marcellinus*, 1941.

Ammir, kind of canoe at one time in frequent use in the highlands of Scotland.

Ammodytes (Gk 'sand-dwellers'), genus of percomorph teleost fishes known as sand-eels. They are elongated fishes with a single long dorsal fin and burrow in the sand. In Denmark they are fished for commercially.

Ammon, see AMEN.

Ammonal, see EXPLOSIVES.

Ammonia, NH_3 , a pungent smelling gas, although the name is often applied to the aqueous solution. It was known to the ancients as being produced by burning nitrogenous organic substances, and owes its name to the practice of distilling camel's dung in Libya near the temple of Jupiter Ammon. Many animal and vegetable products containing nitrogen give off A. when heated and especially if an alkali is added. In the distillation of coal, A. is produced which dissolves in the water, and is recovered as ammonium sulphate by neutralising the liquor with sulphuric acid. A. is formed by bacterial decay of animal and vegetable matter and so finds its way into surface water and the atmosphere. A. is manuf. by the Haber-Bosch process (q.v.), and prepared on a small scale by heating ammonium salts with alkalis. It is also formed quantitatively by the alkaline reduction of nitrates. A. is extremely soluble in water, giving a basic solution of

ammonium hydroxide, from which the ammonium salts can be prepared by neutralisation. '880 ammonia' is the strongest aqueous solution of A. possible, having a sp. gr. of 0.880 and containing about 35 per cent by weight of A. A. can be liquefied at 0° C. by 7 atmospheres pressure, and the heat it absorbs on volatilisation has led to its use in refrigeration. A. is used as an antacid and as a stimulant in cases of fainting. It is a reducing agent at elevated temps. and is used in the manuf. of nitric acid by catalytic oxidation and in the manuf. of urea by reaction with carbon dioxide at 190° C. and 100 atmospheres pressure. A. and its aqueous solution form amines with many salts. The analogy between ammonium and alkali metal compounds suggests the possible existence of the ammonium radical, NH_4 , and this is supported by the formation of an ammonium amalgam by electrolysis of the aqueous solution using a mercury cathode. This was discovered by Seebeck in 1808. The ammonium salts are all water soluble, except the perchlorate, chloroplatinate, and cobaltinitrite, and decompose or volatilise when heated.

Ammonium fluoride, NH_4F , is used as an antiseptic in brewing, in mineral analysis as it decomposes silicates, and for etching glass.

Ammonium chloride, NH_4Cl (sal-ammoniac), is used as a flux in soldering since the hydrogen chloride formed on heating dissolves the metal oxides from the metal surfaces, thus leaving them clean. It is also used in the Leclanché cell and dry batteries.

Ammonium sulphate, $(NH_4)_2SO_4$, is used as a nitrogenous fertiliser.

Ammonium nitrate, NH_4NO_3 , is a very valuable nitrogenous fertiliser and is a constituent of various explosives, e.g. amatols as a diluent of T.N.T.; ammonal, a mixture of ammonium nitrate and powdered aluminium.

Ammonium carbonate, $(NH_4)_2CO_3$, is used in snelling salts, but the commercial carbonate (sal-volatile) is mainly a mixture of the bicarbonate and carbonate.

Ammoniac, Gum, see GUM AMMONIAC.

Ammonites, Semites descended, according to Gen. xix. 38, from Lot (their progenitor being Ben-ammi), and closely related to the Moabites. Their chief city was Rabbah or Rabbath Ammon; their national deity Moloch or Mileom; and their language was akin to Hebrew. Frequently at war with the Jews, they were defeated by Jephthah, Saul, and David, and finally by Judas Maccabeus. The last historical reference to them was by Justin Martyr, who said they were still very numerous.

Ammonius Saccas (c. 160-242), Gk philosopher, founder of Neoplatonism, b. Alexandria. He was originally a porter (whence the surname 'Saccas'). Among his pupils were the grammarian Longinus, Origen, and Plotinus. Although he left no writings, it is believed that he attempted the reconciliation of

Plato and Aristotle. (See NEOPLATONISTS and PLOTINUS.) Saccas must not be confused with Ammonius Hermiae (5th cent. AD), also of Alexandria, sev. of whose commentaries on the works of Aristotle have survived.

Ammonoids, fossil cephalopod molluscs with coiled chambered shells, very wrinkled transverse septa, and well-sculptured exteriors. They range from Upper Silurian to Upper Cretaceous times. They were probably tetrabranchiate, and are allied to the Nautiloids. A. occur abundantly as fossils, and their rapid evolutionary changes make them important index fossils for correlating rocks. An early div., the Goniatites, with rounded or angular sutures (the lines along which the transverse septa join the external shell), are used to zone strata from Devonian to Permian in age. The more specialised A., with minutely wrinkled sutures, enable the Jurassic and Cretaceous rocks to be zoned with great precision.

Ammunition (from Lat. *munire*, to defend, through the Fr.), term embracing all the stores used for attack and defence, including guns, gunpowder, projectiles, and all the accessories. A. is described as *fused* when the projectile, powder, and primer are combined in a single piece generally enclosed in a metal case. In small arms, machine guns, and quick-firing guns it is invariably of this kind. For the larger guns the 3 components are kept separate. The powder is generally packed in bags now made of silk, though serge was once common. The primer may be constructed to ignite by percussion, friction, or an electric current, or by a combination of the first and last (percussion electric). Projectiles are of numerous patterns, to suit the various types of guns. Plain spherical stone balls were first used, and *case-shot* may be traced back to the 15th cent. They are intended for use only at close quarters, and consist of a cylindrical case of sheet iron filled with bullets. On leaving the bore the case breaks and the bullets are scattered broadcast. This shot is useful only against the persons of the enemy, and is valueless for the destruction of defences. The case is the same with *shrapnel shell* (invented at the end of the 18th cent.). They consist simply of common shell filled with bullets, the bursting charge in the base of the shell being fired by a flash from the fuse in the head passing down a central tube. It was found that the bullets were apt to scatter too far and also that premature explosion was likely, so the bursting charge is now made only sufficiently large to open the shell during flight.

Common shell, to which reference has already been made, consist of a hollow cylinder of steel (or occasionally cast iron) filled with ordinary gunpowder or some high explosives such as lyddite. They are essentially a destroyer of material, and so the bursting charge is made as large as possible. High-explosive shell, generally known as 'H.E.', filled with various types of high explosive,

are of modern adoption. With the introduction of armour-plating for ships, armour-piercing projectiles became necessary, as the ordinary cast-iron projectile was useless. These consisted of pointed cast-iron shot specially hardened (by a method invented by Sir W. Palliser), but are now made of forged or cast steel, cast from a special mixture. *Hand grenades*, small, spherical common shell filled with powder weighing 3 or 6 lb., were used in the Russo-Jap. war of 1904. There are also various other extraordinary types of shell, such as the *segment* and *ring* shells, both varieties of the shrapnel. The question of the means to ensure correct rotation is important. In rifled muzzle-loading (R.M.L.) guns this was originally effected by a spiral arrangement of gun-metal studs. This was defective as it caused erosion of bore through the escape of powder-gas. Rotation is now secured by a cupped copper disk or 'gas-check' attached to the base of the projectile. The earlier Armstrong rifled breech-loading (R.B.L.) projectiles were coated with lead, which the explosion forced into the grooves. The lead coating, however, proved too soft, and the use has now become universal of a copper driving-band fitted into a groove round the body of the projectile. During the First World War many new types of A. were introduced to meet the varying methods of warfare. Among these the following are the more important: *Smoke shells*: these contained a smoky mixture which, on bursting, created dense clouds of smoke. Their tactical use was for screening movement, and for ranging guns where the observation of fall of shot was otherwise difficult. *Star shells*, containing parachute lights and made to open in the air by a small charge, were used to illuminate areas in the enemy's position. *Gas shells*: these were first introduced by the Germans. They contained poisonous gases which were released by the bursting of the shell. *Mortar bombs* were introduced for trench warfare. They were fired from trench mortars of varying sizes and were charged with gas or high explosive. Their simplicity of design and lightness in transport made them very suitable for use in trenches. *Aerial bombs*: cylindrical and torpedo-shaped, designed for dropping from aircraft by release from carriers in the machine. The chief types used were those filled with high explosives for damaging buildings, earthworks, railways, and A. dumps, and those with incendiary mixture for setting fire to buildings, etc. *Anti-aircraft shells*: these are filled with high explosives for attacking hostile aircraft, and are arranged to burst in the air by means of a time-burning fuse. All these types were again in use, though much developed in range and power, in the Second World War (1939). Many great changes were introduced in the Second World War. Among them were the much-increased size of bombs carried by bomber aircraft, ranging from 4500 lb. to 12,000 lb., and even heavier than that (see BLOCK-BUSTER). Some of the Ger.

anti-aircraft shells were rocket-propelled, and controlled by radar or radio, thus resembling the Amer. proximity fuse. Another development was the *flying bomb*, which the Germans used for attacking London in 1944-5 (see FLYING BOMB). The V2 or *rocket bomb*, another Ger. missile used against London, had a velocity of 3000 m.p.h. (see ROCKET). In the closing stages of the war missiles of many types were being developed—controlled and guided, target-seeking and free. The Germans had under development a transatlantic rocket that would be capable of making the crossing in a little over a quarter of an hour; while new forms of V1 (flying bombs) and V2, some of them piloted models, were in the experimental stage. *Anti-aircraft rockets, airborne rockets*, and many other types considerably in advance of any missiles then known were also under development in Germany. The *atomic bomb*, the principle of which depends on the fission of uranium nuclei, was used by the Americans against Japan with devastating results (see ATOMIC BOMB).

Ammurapi, see HAMMURABI.

Amnesia (Gk 'lack of memory'), partial or complete loss of memory. Complete A. is practically impossible, as without some memory no intellectual action could continue. The commonest form is that of verbal A., when the names of objects are forgotten. When the patient can partially articulate, the condition is known as A. aphasia. A. may be caused by old age, brain diseases, various forms of insanity, or even by excessive fatigue or weakness. It is not uncommonly met with as an hysterical manifestation in anxiety states, when it functions as a mechanism of retreat from some intolerable stress. See also PSYCHONEUROSIS and ANXIETY STATES.

Amnesty (Gk *amnēstia*, oblivion), act of state granted by a gov. by which pardon (or oblivion) of certain past offences is accorded. It is generally given in the case of whole sections of the community who have been guilty of some offence against the state, and it completely obliterates the offence whether granted before or after conviction. A.s. granted either by the sovereign or by Act of Parliament, are sometimes general, but more often have certain exceptions made; e.g. those responsible for his father's execution were excepted from the A. granted on the accession of Charles II. A.s. were frequently granted to criminals at coronations.

Amnion (Gk *amnion*, a lamb), innermost membrane which invests the foetus of mammals, birds, and reptiles. As time proceeds it thickens and separates from its close adhesion to the embryo; between it and its contents there then accumulates the *liquor amnii* which preserves the embryo from harm and keeps it at a constant temp. Its softness is responsible for its name.

Amoeba (Gk *amoibē*, change), genus of Protozoa, the lowest class of animal life, and type of the order Amoeboides. It consists of naked protoplasm contain-

ing a single nucleus, and the cytoplasm is granular. It contains a *contractile vacuole*, or pulsating space, and possesses the power of throwing out *pseudopodia*, processes which are continuously being drawn back while others are protruded. It is by this succession of pseudopodia formation that the organism is capable of motion in the water. The food is absorbed into any part of the body by intussusception, and the faeces are expelled by any part of the body. There is no sexual reproduction: the A. merely splits in two when it reaches maturity. The resulting organism is transparent and colourless, or faintly yellow, and may be found in fresh water; frequently it is extremely minute. (See illustration, p. 301.)

Species of an allied genus, *Entamoeba*, differing from A. in the absence of a contractile vacuole, occur in the human intestine; one of them, *E. coli*, is harmless, but another, *E. histolytica*, attacks the mucous membrane, causing amoebic dysentery, a disease which is rife in tropical and subtropical countries. See J. Leidy, *Fresh-water Rhizopods of N. America*, 1879, and R. Buchsbaum, *Animals without Backbones*, 1951.

Amoebaeae Verses (Gk *amoibaioi*, interchanging), species of verse in which 2 persons answer alternately. Such are some of Virgil's *Eclogues*.

Amol, dist. and tn of Persia, in the prov. of Mazandaran, on R. Haraz. Pop. of tn 10,000.

Amontillado, see SHERRY.

Amontons, Guillaume (1663-1705), diligent mechanician and experimenter in natural philosophy, b. Paris. He improved the instruments and devised others for measuring the density, temp., and humidity of the atmosphere; he discovered that the boiling-point of water varied with atmospheric pressure—a discovery made nearly at the same time by Halley.

Amoor, see AMUR.

Amorites ('mountaineers,' or possibly 'people of high stature'), anct inhab. of Canaan, on both sides of the Jordan. The name is sometimes used in the O.T. as synonymous with Canaanites, sometimes as that of a special tribe. Sihon and Og, the kings of the A. on the E. of Jordan, were defeated by Moses, and later those dwelling on the W. were defeated by Joshua in 2 battles, and their land was divided among the tribes.

Amoroso (It. 'loving' or 'tender'), in music, indicates a profoundly emotional manner.

Amorphophallus, genus of Araceae found in the E. Indies. The rhizome produces a single enormous leaf annually, and an enormous spadix, bearing both male and female flowers. In the species *A. titanum* the spadix is sometimes 3 ft high.

Amorphous (Gk *a-*, without; *morphē*, shape), term used in biology to denote that a body is formless or irregular in shape. In chem. a substance is A. when it presents no crystallised form.

Amortisation: 1. Law term, signifying

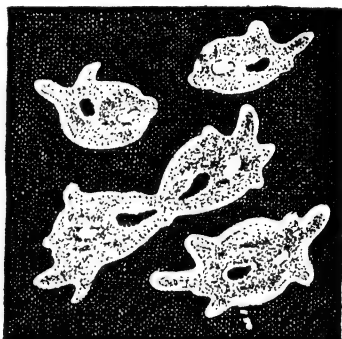
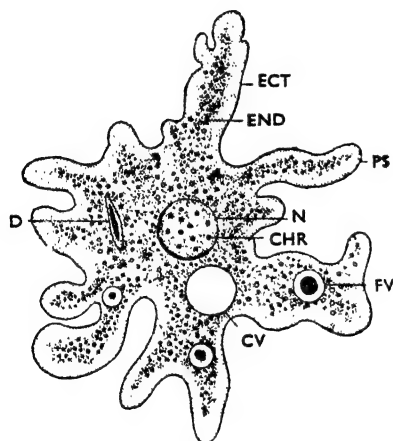
alienation in mortmain ('dead hand'), that is, the alienation of lands or tenements to a corporation.

2. In finance, the provision of a fund out of income for extinction of debt, redemption of bonds or shares, or replacement of capital expenditure.

Amory, Derick Heathcoat (1899-), politician, educ. Eton and Christ Church, Oxford. He entered Parliament as a Conservative in 1945. From 1951 to 1953 he was minister of pensions; minister of state, board of trade, 1953-4; minister of agriculture and minister of food, 1954-5; and minister of agriculture and food since 1955.

whose prophecies were written as well as spoken. The book of A. contains many difficulties, some of which are textual. The concluding passage (ix. 11-14), concerning the restoration of Judah from exile, may be a later addition. See S. R. Driver, *The Books of Joel and Amos* (Cambridge Bible for Schools), 1877, and R. S. Cripps, *The Book of Amos*, 1929.

Amoy (local pronunciation of Hsiamen), Chinese port on is. of the same name in lat. 24° 28' N. and long. 118° 8' E., in the prov. of Fukien. Prior to the Sino-Jap. war (1937) a great many Chinese emigrants were accustomed to sail from A. to



AMOEBA, MULTIPLYING BY DIVISION

Left: AMOEBA PROTEUS

ECT, ectoplasm; END, endoplasm; FV, food vacuole; CV, contractile vacuole; D, shell of a diatom which has been taken in as food; PS, pseudopodium; N, nucleus containing granules of chromium, CHR.

Amory, Thomas (c. 1691-1788), Irish author of eccentric habits who in 1757 was living at Westminster. His books are a medley of autobiography, fiction, scenic descriptions, sentimental rhapsodies, and deist theology. He pub. *Memoirs, containing the Lives of several Ladies of Great Britain*, 1755, and *Life of John Bunce, Esq.* (his best book), 1756 and 1766.

Amos, earliest of the 12 minor prophets. He was a native of Tekoa, near Bethlehem, and followed the occupation of a shepherd and a tender of sycamore figs. He prophesied in the N. Kingdom in the 8th cent. BC, when Uzziah (Azariah) reigned in Judah and Jeroboam II in Israel. He prophesied the death of Jeroboam and the captivity of Israel for the national sins, especially for disloyalty to Yahweh. His style is clear and vigorous, abounding in picturesque images drawn from pastoral and country life. He was probably not alone in warning the people that the expected 'day of Yahweh' might be one of judgment rather than of joy, but he is the first

Malaya and, after making their fortunes there, to return and live in A. The former foreign settlement is on a rocky little is. opposite. A Chinese univ. was founded in 1925. The city exports porcelain and paper, imports raw cotton, cotton manuf. goods, etc. It was captured by the Japanese on 19 May 1938, but returned to China when Japan surrendered in 1945. Since Chiang Kai-shek was defeated and driven from the mainland (1949) he has retained the Quemoy (Chinmen) is. 5 m. E. of A., and has made constant raids in the A. area, greatly hindering the port's trade. The A. is. has been linked with the mainland by 2 stone embankments built in 1956, and a railway was built from Yint'an (in Kiangsi) to the port (466 m.), so far the first in the prov. Pop. 240,000.

Ampelopsis, family Vitaceae, genus of deciduous climbers with twining tendrils, of America and Asia. *A. arborea* is the Pepper Vine of U.S.A.; *A. aconitifolia*, *A. megalophylla*, and *A. heterophylla* are Chinese; *A. brevipedunculata*, Asian; all with handsome foliage. The genus is

much confused with *Vitis* and *Parthenocissus* (q.v.).

Ampère, André-Marie (1755-1836), famous Fr. physicist, naturalist, and mathematician, from whom the ampere, unit of strength of an electrical current, took its name. He was b. in Polémieux, near Lyons. In 1793 his father was guillotined by the revolutionists. This event threw him into a state of deep melancholy, to alleviate which he redoubled his studies. As prof. of mathematics and physics at Bourg le pub. his *Considérations sur la théorie mathématique du jeu*. His great work was in the field of electro-dynamics (electro-magnetism). His records of his discoveries may be found in the *Ann. Chim. Phys.* from 1820 onwards.

Ampère, Jean Jacques Antoine (1800-1864), Fr. literary historian, b. Lyons, the only son of André-Marie A. He was prof. of the hist. of Fr. literature at the Collège de France, and a member of the Fr. Academy, 1847. He was a distinguished philologist, familiar with the languages of most of the many countries he visited. In 1839 and 1841 he pub. hist. of various periods of Fr. literature. In 1848 his *Greece, Rome et Dante* gave an impetus to the study of the great Italians in France. His chief work, on which he was engaged at his death, is his *Histoire romaine à Rome*.

Ampere, unit of electric current. The A. is legally defined as the continuous unidirectional current which, when flowing through a neutral solution of silver nitrate, deposits on the (internally) negative pole 0.001118 grammes of silver in 1 sec. An alternating current is said to have an intensity of 1 A. if it produces in a wire the same heat in the same time as a continuous current of 1 A. as determined by silver deposition. See CURRENT ELECTRICITY and UNITS, ELECTRICAL.

Ampersand (corruption of 'and per se and'), the typographical character & or &. See Jan Tschichold, *Formenwandlungen der & Zeichen*, for 288 varieties from year 79 to 19th cent.

Amphiaræus, legendary soothsayer and hero of Argos, son of Oicles and Hypernestra, and an Argonaut. His wife, Eriphyle, bribed by Polyneices with the necklace of Harmonia (q.v.), induced him to take part in the expedition of Seven against Thebes, where, after fighting bravely, he fled and was swallowed up by the ground. He became one of the immortals, and his temple held a famous oracle.

Amphibia (Gk *amphi*, on both sides; *bios*, life), class of vertebrates of which many are able to live on land for a considerable period—hence the name. The living species include salamanders, frogs, toads, and newts. The class is divided into 4 orders: the *Apoda*, which are limbless, and snake-like; the *Urodela*, which possess tails and usually 4 limbs, e.g. salamanders and newts; the *Anura*, which are tailless and have 4 limbs, e.g. frogs and toads; the *Stegocephali*, an extinct order, lizard-like and bony, usually with long tails.

Gills may be present in the young stages, though these are replaced by lungs in the adult; their hearts possess 2 auricles, 1 ventricle, and a conus arteriosus; when they have limbs the legs are pentadactyl. The eggs are usually laid in water; in the case of the axolotl (see AMBLYSTOMA) breeding takes place in the larval stage. The eggs often develop into tadpoles, but some A. are viviparous and bring to life perfect animals. They are carnivorous when adult, and hibernates. In organic life they rank between reptiles and fishes. Many live in tropical countries, but frogs and toads are universally distributed. See G. A. Boulenger, *Catalogue of the Batrachia in the British Museum*, 1882, and H. Gadow, 'Amphibia and Reptiles,' in the *Cambridge Natural History*, 1901.

Amphibole (Gk *amphibolos*, ambiguous), group of minerals which enter into the composition of a large number of rocks. They are essentially silicates of calcium and magnesium, but also include oxides of iron and of manganese. They crystallise in oblique prisms, and some are used as gems. The chief varieties are tremolite, actinolite, nephrite, and hornblende.

Amphibology, or **Amphiboly** (Gk *amphi*, on both sides; *ballein*, throw) means an ambiguous statement, a sentence susceptible of more than one interpretation, especially if it is capable of being construed grammatically in different ways, e.g. 'I have read your volume of verse and much like it.'

Amphibrach (Gk, 'short on both sides'), in prosody a foot of 3 syllables, the first and last short or unaccented, the middle long or accented, as in 'amazing.'

Amphictyonic League. An amphictyony was a confederation of neighbouring tribes, or those having interests in common. The participants in such a league were called amphictyons, or dwellers around. There were sev. A. Ls in anc. Greece, as those of Argos and Delos, but the chief was that which maintained the worship of Demeter at Thermopylae and of Apollo at Delphi. Its origin was certainly very early, being connected traditionally with Amphictyon, son of Deucalion, and, though much of its authority was lost in the 3rd cent. BC, it still existed with limited power under Rom. rule, and is last mentioned in the 2nd cent. AD. The names of the tribes concerned differ in various accounts. The list given by Arschines includes the Thessalians, Boeotians, Dorians, Ionians, Perthæans, Magnetes, Locrians, Oetaeans, Phthiotæ, Malians, and Phocians. It is known that there were 12 tribes, so to this list either the Dolopians or the Aenianians should be added. Each tribe sent 2 deputies of equal authority, forming a council which met twice each year, alternately at Delphi and Thermopylae. Though the functions of the council were mainly religious, judicial rights and the regulation of peace and war came within its scope.

Amphigouri, or **Amphigory** (Gk *amphi*,

on both sides; *agoreuein*, speak), meaningless composition with a semblance of sense, e.g. a nonsense verse such as that attributed to Dr Johnson:

If a man who turnips cries
Cry not when his father dies,
'Tis a proof that he would rather
Have a turnip than a father.

Amphilochus, son of Amphiarus (q.v.) and Eriphyle (q.v.), took part in the expedition of the Epigoni (q.v.) against Thebes, assisted Alcmaeon to murder their mother and, later, fought against Troy. Like his father, he was a noted seer. Killed in single combat by Mopsus, also a seer.

Amphimaer (Gk 'long on both sides'), in prosody, a foot of 3 syllables, the first and last long, the middle short, as in Lat. *căstîlîs*. It is little used in Eng. verse.

Amphion, skilful musician, son of Zeus by Antiope, who, driven out of Sicyon by her husband, Lycus of Thebes, and Dirce his wife, fled to Mt Cithaeron. There A. and his twin brother Zethus were born. They were exposed, but found and reared by a shepherd. At manhood they revenged their mother's wrongs on Dirce by causing her to be dragged to death by a bull. They then seized Thebes, and during the building of its fortifications the stones moved to, the sound of A.'s lyre. He married Niobe, and was killed by Apollo.



AMPHIOXUS LANCEOLATUS

The notochord runs from tip to tip. T, tentacular cirri; G, reproductive organs; AP, atriopore; A, position of anus.

Amphioxus, or **Branchiostoma** (Gk *amphi*, on both sides; *oxus*, pointed), genus of protochordates belonging to the class Cephalochordata. A gelatinous stiffening rod, the notochord, runs from the tip of the snout to the tip of the tail. The mouth is surrounded by a fringe of tentacular cirri and leads to a spacious, long pharynx which bears many gill slits. Currents set up by cilia on the tentacles and pharynx draw minute food particles into the foregut and these become entangled in a mucus secreted by glands on the floor of the pharynx. While spending much time partly buried in the sand they can swim readily by a series of undulating movements. The particular zoological interest of these creatures is that in many features of their structure they may well be not unlike the ancestor of the vertebrate animals. See A. Willey, *Amphioxus and the Ancestry of the Vertebrates*, 1884.

Amphipoda (Gk *amphi*, on both sides; *pous*, foot), order of Crustacea characterised by their laterally compressed bodies, sessile eyes, and absence of a

carapace. They are both marine and fresh-water animals. Species of the sub-family Orchestina are known as the beach-flea and sand-hopper.

Amphipolis, anct city of Macedonia, on R. Strymon, which almost encircled the place, whence the name A. Originally a Thracian tn belonging to the Edonians, it was colonised by the Athenians in 437 BC. Situated about 3 m. from the sea, and commanding the approach to mines and timber forests in that area, A. was one of the most important Athenian possessions N. of the Aegean.

Amphisbaenidae (Gk *amphisbaina*, a serpent that can go both forwards and backwards), family of the Lacertilia, or lizards. These worm-like reptiles have no limbs, and the scales are replaced by a series of horny rings. They are found in tropical America, Africa, and Europe, where they feed on worms and ants. *Amphisbaena fuliginosa*, of Brazil and Guayama, is dusky brown and nearly 2 ft long. The natives regard its dried and powdered body as of medical value.

Amphissa (modern *Salona*), tn of anct Greece, about 80 m. NW. of Athens, situated at the foot of Mt Parnassus. Its inhab., the Locri Ozolae, having tilled the ground of the temple of Delphi, the Greeks under Philip of Macedon attacked and destroyed the tn (338 BC). It was afterwards rebuilt. Pop. of modern Salona, 5500.

Amphitheatre, form of building invented by the Romans for the purpose of holding gladiatorial shows and displays of wild beasts. Originally these entertainments were held in the forum or the circus, but as early as 70 BC a wooden A. of the recognised shape, i.e. having seats all round the portion reserved for the performance, existed at Pompeii. The first A. to be erected in Rome was the temporary one of Curio in 59 BC, and Caesar erected a permanent structure in 46 BC. The Colosseum (q.v.), the most famous stone example still remaining, was begun by Vespasian and dedicated by Titus in AD 80. It is elliptical in shape, measuring 616 ft by 510 ft, and the exterior wall, 160 ft high, consists of 4 storeys, the lowest 3 being arcades in the Doric, Ionic, and Corinthian styles respectively, and the top a row of Corinthian pilasters. Inside, the *cavea* or portion for spectators (accommodating over 50,000 persons), consists of the *podium*, or lowest tier, reserved for guests of honour, and 3 rows of *maeniana*, for the various grades of the populace. The arena measures 280 ft by 176 ft. The A. at Arles was capable of containing 20,000 spectators; and the Rom. A. at Caerleon in Monmouthshire about 6000.

Amphitrite, Gk sea-goddess, daughter of Nereus and Doris, and wife of Poseidon.

Amphitryon, son of Alcaeus, King of Tiryns, married Alcmene, who, in his absence, was visited by Zeus disguised as her husband.

Amphiuma (Gk *amphi*, on both sides; *pneuma*, breath), genus of Amer. Amphibia of the order Urodela and family Amphiumidae. It is allied in most

essentials to the water-newt, is eel-like, about 2 ft long, has 2 or 3 jointless toes on each of its 4 limbs, minute eyes, and numerous teeth in the palate in 2 rows. As a tadpole it has gills; in adult life only the gill slits remain. It lives in ponds and marshes, and buries itself in mud in the winter. *A. means*, the 3-toed species, inhabits Louisiana; it is called the Congo snake by the inhab. of Florida, and is erroneously believed to be venomous.

Amphora (plural **Amphorae**), large, slender, two-handled jar, often with a blunt point at the base for insertion into soft ground to keep the vessel upright. Amphorae were used for the transport and storage of wine, oil, fish-pastes, hazelnuts, etc., and afterwards were sometimes used as cinerary urns. Pieces of them are common on Roman sites.

Ampleforth College, public school for boys, identified with the Benedictine community of Ampleforth. They were exiled to France at the Reformation, and restarted the school at Ampleforth, York, in 1802.

Amplepuis, Fr. tn in the dept of Rhône, 30 m. NW. of Lyons. It manufs. cotton, silk, and muslin. Pop. 1000.

Amplifier, circuit containing a valve (q.v.) or transistor (q.v.) for increasing the intensity of the signal in a radio receiver or of the input in a sound-reproducing or sound-recording circuit. The high-tension supply may be connected to the anode of the valve through a resistance or an inductance or the output circuit may be coupled to the A. through a transformer or a tuned circuit. Transformer-coupled and resistance-coupled A.s may be used on all frequencies, tuned A.s are used on narrow frequency bands. The various methods may be used in combination. In negative feedback, some of the output energy is returned to the A. circuit. This reduces distortion and noise, and the phase shift, but also the gain. See **LOUDSPEAKER**.

Amplitude, astronomical term denoting the angular distance of a heavenly body, at the time of its rising or setting, from the E. or W. point of the horizon. Thus the A. of fixed stars is constant, while that of the sun is zero at the equinoxes. The A. of the sun at any time other than during the equinoxes varies with the date and also with the lat., e.g. at the summer solstice the A. of the sun is 23° 28' at the equator but 39° 44' in the lat. of Greenwich.

Amphill, Arthur Oliver Villiers Russell (1869-1935), 2nd Baron, Brit. administrator, son of the 1st baron, b. Rome, and educ. at Eton and Oxford. He succeeded to the title in 1884. He was Governor of Madras 1899-1906, and during 1904 temporary Viceroy and Governor-General of India in Lord Curzon's absence.

Amphill, Odo William Leopold Russell, 1st Baron (1829-84), Brit. diplomat, b. Florence and educ. privately. He entered the diplomatic service in 1849 and served as attaché at Vienna. From 1850 to 1852 he was in the Foreign Office. Subsequently he was employed in turn at the

embassies in Paris, Vienna, Constantinople, and Washington. As secretary of legation at Florence and Brit. representative at the Vatican he performed valuable diplomatic services from 1858 to 1870. In 1870 he was appointed assistant under-secretary at the Foreign Office, and in 1871 he became ambas. at Berlin, where he attended the Berlin Congress. He was made a privy councillor in 1872 and created a baron in 1881.

Amphill, mrkt tn of Beds, England, 8 m. SW. of Bedford. Near it are the ruins of Houghton House, supposed to be the original of the 'House Beautiful' in Bunyan's *Pilgrim's Progress*. A. House was the seat of the A. family. Pop. 3000.

Ampulla (Lat. *ampulla*, bottle), Rom. bottle with a narrow neck; a vessel for holding the holy oil at coronations, etc.

Ampurdán, El, see **FIGUERAS**.

Ampurias, ancient settlement in Spain, near Figueras (q.v.), ruins of which still exist. The Phocaean (see **PHOCAEA**) in the 6th cent. BC transferred an is. settlement to the mainland here and called it Emporeium. Later a veterans' colony was founded here by Julius Caesar and named Emporiae; in Gothic times this was a bishopric.

Amputation, cutting off of a limb or projecting part of the body. A. is resorted to only if to leave the part would be dangerous to life or affect the health of the patient, or if the part has become so functionless as to be a handicap or a cosmetic embarrassment. Thus a limb or a part which is grossly infected, gangrenous, or irreparably injured may have to be amputated. A. may likewise be performed in the case of a part—a breast, for instance—which is the site of a primary cancer. Limbs that are completely useless are amputated as a last resort when all orthopaedic aids have failed and when it is certain that the substitution of an artificial part for the original will ensure better function. Careful consideration is always given to the functional importance of a part when the question of its A. arises. Thus a surgeon will preserve a thumb, an index finger, or a big toe as long as there is any hope of its recovery. But fifth fingers and fifth toes may be sacrificed with cosmetic loss only. The site of any A., when there is a choice in the matter, has to be selected with an eye to leaving a stump to which the most efficient type of artificial limb may be attached. Owing to the advent of the antibiotics, A.s for septic conditions are now rare.

Amr, Mosque of, earliest Arab building of Cairo. It dates from AD 643.

Amravati, ruined city of Madras state, India, on R. Kistna. Formerly one of the chief centres of the Buddhist kingdom of Vengi. There was once a great Buddhist tope of which very little now remains.

Amritsar, city of E. Punjab state, India, 33 m. E. of Lahore (Pakistan). An important commercial centre, A.'s most famous manufs. are *Pashmina* (fine wool fabrics), silk, and carpets. It is the religious centre of the Sikhs and contains

their famous Golden Temple, situated in the centre of the Sacred Tank (or lake). The temple, which was destroyed in 1761, was rebuilt in 1764 and roofed by Ranjit Singh with sheets of copper gilt in 1802. In the temple is the original of the holy book, the Granth Sahib. Close by is Jallianwala Bagh, an open space, where in 1919 Brig.-Gen. Dyer ordered troops to open fire upon a prohibited mass demonstration, an act for which he was severely condemned by the Brit. Gov. with the approval of the House of Commons. Pop. 320,465.

Amru-Ibn-Al-Aas (d. AD 663), famous

studied at Zürich, Munich, and Rome. He became prof. of line-engraving at Munich, 1829. His best works are 'Triumphal March of Alexander the Great' (Thorwaldsen), 'Triumph of Religion in the Arts' (Overbeck), and reproductions of Raphael.

Amsteg, Swiss tourist resort in the canton of Uri, 7 m. S. of Altdorf, on the St Gotthard railway.

Amstelodamum, latinised form of Amsterdam (q.v.).

Amsterdam: 1. (the dam of the Amstel) Official cap. and largest city of the Netherlands, in the prov. of N. Holland, situated



Netherlands National Tourist Office

THE CENTRE OF AMSTERDAM, SHOWING THE 'NIEUWE KERK'

Arabian warrior who, after bitter opposition to Mohammed, ultimately became one of the prophet's chosen supporters. From Mohammed's successor, Abu-Bekr, he obtained a command in the army in Syria. He fought at the battle of Aynadin and distinguished himself in the sieges of Damascus and Jerusalem. In the years 638-40 he conquered Egypt, the campaign terminating in the capture of Alexandria, when he is said to have been responsible for the destruction of the Alexandrian library. This charge, however, has never been proved. In his subsequent administration of Egypt he exhibited great ability, interesting himself in various public works, amongst which is said to have been the construction of a canal joining the Red Sea and the Mediterranean.

Amrum, or **Amrom**, one of the N. Frisian Is. in the N. Sea, belonging to Germany. Its length is about 6 m. Area 8 sq. m.; pop. 2840.

Amstler, Samuel (1791-1849), Ger. engraver, b. Schinznach, Switzerland,

at the mouth of the Amstel R., in the SW. corner of the IJsselmeer, formerly Zuider Zee. It is connected with the N. Sea by the N. Sea Canal, 15 m. long, to the construction of which (1876) it owes much of its present prosperity. A new canal, leading to the R. Vaal, S. of Utrecht, was completed in 1952 to improve the connection between A. and the Rhine; it is accessible for very large vessels by day and night, not depending on tide. Though the importance of its shipping is secondary to that of Rotterdam, it is the H.Q. of the ship-owning interest and of the trade with the Dutch E. Indies; its prin. imports are coal, ore, grain, petroleum, tobacco, tea, coffee, cocoa, sugar, timber, and oil seeds, while it has considerable exports of dairy produce, paper, cokes, artificial manure, sugar, and hides. A. is also an important centre of banking and insurance companies.

Among the chief industries are diamond cutting and polishing, for which the city has long been famous, sugar-refining, manufacturing of ready-made clothes,

letter-casting, printing offices, iron, soap, dye, chemical manufs., shipbuilding, brewing, distilling. The tn is remarkable for the number of its well-equipped docks and quays, and for its canals (*grachten*) by which it is intersected in all directions, crossed by about 400 bridges. In this last respect it has been likened to Venice. There are many notable buildings and institutions, among which must be mentioned the royal palace, completed in 1665, built as a tn hall; the New Church (Nieuwe Kerk), a splendid Gothic building dating from 1408 and notable for its stained-glass windows and monuments; the Old Church (Oude Kerk), dating from the beginning of the 14th cent.; the St Antonieswaag, originally a tn gate and now the site of the A. Historical Museum; the Trippenhuys (1662), and of modern date the Exchange (Koopmansbeurs) and the Netherlands Trading Co. office building. The Rijksmuseum (state museum) contains the wonderfully fine national collection of Dutch and Flem. pictures. Rembrandt lived in A. (1631-69), and his house is now a museum, containing sev. of his paintings and illustrations. There are also botanical and zoological gardens, the latter being one of the finest collections in Europe. A. has 2 univs., the Municipal Univ. and the Free Univ., and many other educational and charitable institutions. There are 54 Protestant and 40 Rom. Catholic churches, and 6 synagogues. The synagogue of the Portuguese Jews, built in 1670, has a magnificent interior. Houses are built on wooden piles, and the royal palace stands on 13,659.

The hist. of the city dates from the beginning of the 13th cent. when Giesebrecht II of Amstel built a castle there. At this time it was nothing more than a fishing vil. It received its first charter from Guy of Hainaut, Bishop of Utrecht, in 1300, and joined the Hanseatic League in 1369. In the 16th cent. A. accepted the Reformation and became known as a city of toleration for many religious refugees. Its prosperity greatly increased on the decline of that of Antwerp. In 1648, with the closing of the Scheldt by the treaty of Westphalia, A. secured even greater advantages at the expense of the Belgian city, though a due share of its commercial advance in the 17th cent. must be assigned to the foundation of the Dutch E. India Co. (q.v.) in 1602 and the Bank of A. in 1609. The Prussians occupied the city in 1787, and it was taken by the French in 1795. Chosen by Louis Bonaparte in 1808 as the cap. of the Netherlands, it was officially recognised as the third city of the Fr. empire from 1810 to 1814.

During the brief resistance of the Dutch forces to the Ger. invasion of Holland in May 1940, many air-raids were carried out at Schiphol (A. Airport). Ger. destruction of the harbour installations began early in Sept. 1944, when the Allies reached the S. border of the Netherlands. After a few days, with the halting of the advance, the work of destruction was stopped; it was not resumed.

Though falling short of what was originally planned, Ger. destruction was great. In spite of so much destruction, the port of A. was far from being a total loss. The greater part of the harbour, especially on the E. side, was almost untouched, except where cranes had been blown up. The links with the hinterland—to the E. across the IJsselmeer (Zuider Zee) and to the S. as far as the Rhine—were intact at the end of the war. The restoration of the port began immediately after the liberation of A., and by the close of 1945 much of the damage had been made good and the quays had been cleared. Pop. (1954) 863,800.

2. City of Montgomery co., New York State, U.S.A., 30 m. NW. of Albany, on the Mohawk R. An industrial city, it is important for the manuf. of carpets and rugs. Pop. 32,300.

Amsterdam, New: 1. Name of New York under the Dutch.

2. Port and market centre of Brit. Guiana, cap. of Berbice co. and dist., at mouth of Berbice R. 55 m. SE. of Georgetown. Pop. 9,570.

Amsterdam Island, see KERGUELEN ISLAND.

Amt, administrative dist. in Denmark. The country is divided into 25 *amter*, each headed by a chief administrative officer, called *amtmand*, who is appointed by the central gov. For police administration, however, Denmark is divided into 72 police dists.

Amu-Darya, known to the Greeks as the Oxus and to Arab geographers as the Jayhun. A great riv. of central Asia, it rises in the Pamirs, being formed by the junction of the Pyandzh and Vakhsh R.s. It forms the Soviet-Afghan border for 200 m., eventually flowing through the reps. of Tadzhikistan, Turkmenistan, and Ozbekistan into the Aral Sea. Its total length, including the Pyandzh, is 1,577 m. It is navigable as far as Termez.



AMULET

Amulet, charm, worn or placed in a building as a protection against evil spirits. The use of A.s comes from the E., where it has existed from very early times. The anc. Babylonians and Egyptians had a strong belief in the protective power of charms, and the custom was to a certain extent handed on to the Greeks and Romans in the W. A.s have been made of many substances, the most common being precious stones, metals, either in the natural state or

made into articles of jewellery or images, and inscribed parchments, often enclosed in sachets or gold balls. Plants and parts of animals, especially the teeth, were also used. A.s are still in vogue in the E. and in S. Europe, where their aid is particularly invoked against the 'evil eye.' Buddhists and the Muslims both use A.s with a religious significance.

Amun, see **AMEN**.

Amundsen, Captain Roald (1872-1928), Norwegian explorer and navigator, took to the sea after graduating at Oslo Univ. and studying medicine. He served for some time as an able seaman in various whaling and sealing vessels, at the same time studying navigation and equipping himself in other ways for more responsible positions. He was subsequently appointed by Capt. De Gerlache to be first mate of the *Belgica* on the occasion of his Antarctic expedition. This expedition visited the S. Shetland Is., and was the first known to winter in the Antarctic. About 4 years later A., with a few companions, started on the ambitious enterprise of navigating the NW. passage, which he succeeded in doing in 1906, being the first man to accomplish the feat. In 1909 he visited London and announced to the Royal Geographical Society his preparations for an important expedition to the Arctic. In 1910 he set out in the *Fram*, presumably for the N., but the success of Peary in reaching the N. Pole induced him to abandon his project, temporarily at least, and in 1911 it was found that he was going to try to forestall Scott in the dash for the S. Pole. In this attempt he was successful, reaching the Pole on 14 Dec. 1911, after a comparatively easy journey. In the First World War he served with the Norwegian Naval Air Service, and from that time would appear to have favoured aerial navigation for exploration. It was not until 1918 that he took any further part in exploration, in which year he bought the *Maud* with the idea of drifting across the Pole. He navigated the NE. passage, but early in 1919 his engine broke down and he was compelled to land in Alaska. Two years later he tried to reach the Pole in an aeroplane from the *Maud*, but without success. In 1925, having become bankrupt, he went to the U.S.A., where the Amer. explorer Lincoln Ellsworth offered to finance him in a joint flight from Spitsbergen. The 2 explorers, however, had only traversed some 500 m. when they were compelled to abandon the enterprise. A. then made arrangements to join Nobile in his dirigible, and in May 1926 he and Nobile, together with Ellsworth and Lt. Riiser-Larsen, started from Spitsbergen and in 3 days landed in Alaska. A.'s days of exploration finished with this feat, but in 1928, hearing of the plight of his old companion, Nobile, he set out in a seaplane to attempt his rescue. In this A. and his pilot lost their lives. See **ARCTIC EXPLORATION** and **ANT-ARCTIC EXPLORATION**.

The story of his 2 chief achievements is told in his *The North-west Passage*, 1908, and *The South Pole*, 1912. He

also wrote *The North-east Passage*, 1918-1920, *The Flight across the Polar Sea*, 1926, and *My Life as an Explorer*, 1927. See also B. Partridge, *Amundsen*, 1953.

Amur: 1. Riv. of E. Asia, known in Chinese as Heilungkiang (Black Dragon R.), formed by the confluence of the Shilka and the Argun', westward of the Khingan Mts. It has a total length of about 1700 m., not counting the head-waters, the first 800 m. being in a S.-easterly direction and dividing the A. oblast from Manchuria, after which it flows NE. through the Khingan Mts into the sea of Okhotsk at Nikolayevsk. It is navigable for its entire course. Its chief tribs. are the Sungari, the Ussuri, the Zeya, and the Bureya. The most important towns situated on it are Blagoveshchensk, Aygun', Khabarovsk, and Komsomol'sk.

2. Oblast in the Russian Far East, between A. riv. and the Stanovoy Range, largely forested, with rich mineral resources. Area 139,000 sq. m.; pop. (1956) 737,000, mostly (since 1850) Russians and Ukrainians. It is an important agric. and industrial area (grain and dairy farming; gold- and coal-mining, saw-milling, and food industries). The cap. is Blagoveshchensk.

Amurath, or **Murad**: 1. A. I, Sultan of Turkey 1359-89; he began the Turkish conquests in Europe, and estab. his kingdom as far as Sofia. 2. A. II, sultan 1421-51; he defeated the Hungarians at Varna and Kosovo. 3. A. III, sultan 1574-95. 4. A. IV, sultan 1623-40; notorious for extreme cruelty. 5. A. V, sultan May-Aug. 1876.

Amwythig, see **SHERWSBURY**.

Amyclae, anct in of Laconia, Greece, on R. Eurotas, 2½ m. SE. of Sparta. It was the chief tn of the Achaean, and remained independent after the Dorian conquest. The festival of the Hyacinthia was celebrated here annually. Excavations have revealed the sanctuary and 'throne' of Zeus Amyclaeus.

Amygdalin (C₂₀H₂₇O₁₁N), glucoside found in bitter almonds, cherry kernels, and other vegetable products. When macerated and kept in contact with water, fermentation sets in, due to the presence of emulsin, and the substance is decomposed into hydrocyanic acid (prussic acid), benzaldehyde, and glucose.

Amygdaloid (Gk *amugdalon*, almond; *eidos*, shape), the old name of a variety of igneous rock, usually basaltic, containing cavities in which round or almond-shaped bodies are formed, consisting of agate, calcareous spar, or zeolites.

Amygdalus, name of a sub-genus of *Prunus* formerly considered as a genus, of the family Rosaceae. It includes *P. communis*, the almond (q.v.), and *P. persica*, the peach (q.v.).

Amyl, organic radical corresponding to the formula C₅H₁₁. There are 8 A. alcohols, the most important being isobutyl carbinol, which is a constituent of fusel oil. A. nitrite is a yellow liquid with a penetrating odour, used in medicine for angina pectoris, etc., owing to its power of producing vascular dilation and of stimulating the heart's action.

Amylene Hydrate, see HYPNOTICS.

Amyloaine (Stovaine), in the form of the hydrochloride, used as a local anaesthetic. It is a white, odourless crystalline powder with a bitter taste. It has about half the toxicity of cocaine, but is much more irritant and less powerful as a surface anaesthetic. It is mainly used for the production of spinal anaesthesia (see ANAESTHESIA).

Amyloid Degeneration, also known as lardaceous degeneration, or waxy degeneration, a condition in which there is a degeneration of the cells of certain organs by which an amyloid or lardaceous substance is formed. It is a secondary condition and occurs in association with chronic suppuration or infections such as syphilis (q.v.) and tuberculosis (q.v.). It attacks most frequently the liver, kidneys, spleen, intestines, and lymphatics.

Amylopsin, diastatic ferment from the pancreatic juice, capable of converting starch into sugar. See DIGESTION.

Amylum, see STARCH.

Amyntas: 1. King of Macedonia (c. 540-498 BC).

2. King of Macedonia (393-369 BC), was the son of Philip, the brother of Perdiccas II. He sought the friendship of Athens, and left by his wife Eurydice 3 sons: Alexander, Perdiccas, and the famous Philip, called by Ovid Amyntiades.

Amyot, Jacques (1513-93), Fr. writer and translator, b. Melun. In 1540 he became prof. of Greek and Latin at Bourges; in 1558 tutor to the sons of Henry II; in 1560 grand almoner of France; and in 1570 Bishop of Auxerre, where he d. His most famous trans. was that of Plutarch's *Lives*, 1559, which, besides being used by Corneille and establishing itself as a model of Fr. prose style, formed the basis of North's trans. into English, 1575, from which Shakespeare took his Rom. plots. Other works were trans. of *Theagenes and Chariclea*, 1546; 7 books of Diodorus Siculus, 1554; Longus's *Daphnis and Chloe*, 1559; and Plutarch's *Moral Treatises*, 1572, all of which have become Fr. classics. See A. Clorancescu, *Vie de J. Amyot*, 1941.

Amyris, family Burseraceae, genus of evergreen W. Indian trees, yielding fragrant resin. *A. balsamifera*, Rhodes Wood, and *A. elemifera*, Gum Elemi Tree, are chief species.

An Tostal, see TOSTAL.

An Uaimh, chief tn of co. Meath, Rep. of I., at the confluence of the R.s Boyne and Blackwater. This historic tn, the scene of many wars, has numerous important archaeological remains in the vicinity, including Beective Abbey (q.v.) and Tara (q.v.). Industries include agric. implements, carpets, furniture, and woollen goods. Pop. 4300. (Formerly Navan.)

Ana, suffix added to the names of famous men to designate collections of their sayings and table talk, anecdotes about them, and notes in any way bearing on their life, e.g. Johnsoniana, Boswelliana, Shakespeariana. The use of such

titles dates from the *Scaligerana*, collected by the brothers Vassan and pub. in 1666 by Isaac Vossius.

Anabaptist, name of a Christian sect which appeared in Germany at the Reformation, repudiating infant baptism (hence the name, meaning 'baptised again,' which refers to their adult baptisms) and teaching equality and community of all goods. The movement was begun about 1520 in Saxony by the 'Prophets of Zwickau.' They were strongly opposed to Luther, but their leader, Thomas Münzer, travelled over Bohemia, Thuringia, and Switzerland preaching with much success, especially at Waldshut, on the Swiss border. He joined and largely engineered the Peasants' War in S. and central Germany, and was executed after the defeat of his party at Frankenhausen in 1525. The A. doctrines were still propagated by wandering preachers, like Melchior Hoffmann, who in 1528 installed John Matthiesen as a bishop at Emden. He sent out many disciples, 2 of whom founded the theocratic state of Münster in 1533. An era of wild licentiousness in this city followed, under Johann Bockholdt (q.v.), crowned in 1534 as prophet and king, assisted by Rothmann, Knipperdolling, Krechting, Kippenbrock, and Matthiesen. The city was besieged and taken by Protestant princes in 1535, and on the execution of the leaders the movement began to die out, though still continuing in the Netherlands under David Joris (John of Bruges) and others. A revival began with Menno Simons, who estab. a community which, while rejecting infant baptism, gave up the objectionable features of the A. creed. The Mennonites, who spread all over Germany, Switzerland, and Holland, practically correspond with the Baptists in England, by whom adults are baptised on joining the Church. Menno's doctrines are expounded in his book, *Elements of the True Christian Faith*, written in Dutch. See K. B. Bax, *Rise and Fall of Anabaptists*, 1903, and R. J. Smithson, *The Anabaptists: their Contribution to our Protestant Heritage*, 1935.

Anabas, genus of percomorph fishes of the family Anabatidae. *A. scandens*, the climbing perch, resembles a perch to some degree. It has large scales, and can remain for a considerable time without water, travelling overland in search of it. During these travels it may be seized by crows and kites and placed in the branches of trees for future use. Hence its supposed climbing habits.

Anabasis, name of 2 (Gk historical works: (1) Xenophon's (4th cent BC), recounting the defeat of Cyrus the younger by Artaxerxes and the retreat of the 10,000 Greeks in his army under Xenophon. (2) Arrian's (AD 166-8), recording the campaign of Alexander the Great.

Anableps (from Gk *anablepsin*, to look up), genus of cyprinodont fishes found in tropical America. They are remarkable for their projecting eyes, which are divided horizontally into upper and lower halves—for vision above water and below water respectively. They are the largest

of the cyprinodonts, reaching a length of a foot.

Anabolism (Gk *ana*, on high; *bolos*, heap), building-up process in the protoplasm of a living organism, as opposed to *katabolism*, or the breaking-down process. See **METABOLISM**.

Anacardiaceae, family of dicotyledonous plants growing chiefly in tropical countries. They are trees or shrubs which abound in an acrid resin. The flowers are usually in parts of 5, the stamens less than 10, carpels 3, with a single ovule. *Anacardium*, *Comocladia*, *Mangifera*, *Melanorrhoea*, *Pistacia*, *Rhus*, *Schinus*, and *Spondias* are chief genera.

Anacharis is synonymous with *Elodea*, genus of water-plants of the family Hydrocharitaceae which grows in America. *A.* (or *E.*) *canadensis*, the Amer. waterweed, was transplanted to England, and grew rapidly to choke watercourses, but in time became less rampant.

Anacharsis, Scythian philosopher said to have been a friend of Solon (q.v.), and the only barbarian admitted to Athenian citizenship. Some writers place him among the Seven Sages of Greece. Numerous epigrams were attributed to him, including the saying that at Athens were men who deliberated but left the decision to fools. His proverbs are preserved by Diogenes Laërtius, Plutarch, and Lucian. *A.* was killed by the King of Scythia for worshipping Cybele with Gk rites. Aldus, in his collection *Greek Epistolographers* (Venice, 1499, 4to), pub. 9 letters under the name of *A.*, which were pronounced by Bentley to be forgeries. The other works ascribed to *A.*, such as an epic poem of 800 verses, a work on war, on the laws of the Scythians and some Gk customs, are lost; but they were certainly no more genuine than the letters.

Anacharsis the Younger, see **BARTHELEMY**, JEAN JACQUES.

Anachronism (Gk *ana*, back; *chronos*, time), reference of an event, custom, or expression to a wrong date. This is common in literature and other forms of art, especially painting, and although it most often is the result of an oversight or of ignorance on the author's part, it is nevertheless sometimes a deliberately adopted device made for heightening a dramatic effect, or for achieving condensation. It is not easy to decide whether an *A.* is deliberately intended by the author. When Shakespeare peopled ancient Athens with Elizabethan joiners, weavers, and bellows-menders he may have been 'writing down' to his audience or have been unconscious of any *A.*, but when he makes Cassius in *Julius Caesar* say 'The clock hath stricken three,' the *A.* was probably intentional. In the 16th and 17th cents. *A.s* abound in the works of dramatic and other writers, but it does not follow that artistic merit of their work is thereby spoilt. When Lucifer is expelled from heaven with the aid of cannons and gunpowder, the dramatic effect of Milton's story is increased, for by the time he wrote his *Paradise Lost* men had come to think always of battle as being enshrouded in a sulphurous

canopy. Where, however, an attempt is obviously made to give correct local colour and *A.* is intentional, the artistic harmony is disturbed. For Shakespeare to make, as he does in *Troilus and Cressida*, Agamemnon quote Aristotle is almost as bad as when he places Verona on the sea-coast (the latter is an error, but not an *A.*, for it has no reference to time). But Virgil, in making Queen Dido the contemporary of Aeneas, violates no artistic canons. The Renaissance painters were frequently guilty of *A.*, and the Flem. school even went to the length of putting spectacles on the noses of scriptural characters.

Anacoluthon (Gk *a-*, not; *akolouthos*, following) is grammatical non-sequence, the latter part of a sentence failing to correspond with the first part. Usually it is a grammatical fault, e.g. 'As a regular reader of your paper, why does it give so little space to sport?' But it can also be deliberately employed to add force or emphasis, as in Luke v. 14, 'He charged him to tell no man; but go, and show thyself to the priest.' See also **FIGURE OF SPEECH**.

Anaconda, co. seat of Deer Lodge co., Montana, U.S.A. Smelting and the by-products of smelting are the prin. industries; bricks, metal castings, beverages, dairy products, live-stock, and potatoes are produced. The mine offices of the A. Copper Mining Co. are here. Pop. 11,260.

Anaconda, S. Amer. water-snake, allied to the boa-constrictor, which lives on the banks of rivs. in Brazil and Guiana. It is one of the largest of living snakes, growing to a length of over 30 ft.

Anacreon (c. 570-485 BC), Gk lyric poet, b. Teos, Ionia, and emigrated to Thrace before the Persian invasion. About 540 he went to the court of Polycrates of Samos, and in 521 to the house of Hipparchus at Athens. He lived here till the fall of the Pisistratids, about 514, and then accepted the patronage of Echekratidas of Thessaly. He is said to have been choked by a grape stone. The Alexandrians possessed 5 books of his odes to the muses, wine, and love, but of these only a few genuine fragments remain. The Anacreontic odes trans. by Cowley and Moore are later imitations. The fragments are included in J. M. Edmonds, *Lyra Graeca* (with trans.), 1922. See C. M. Bowra, *Greek Lyric Poetry*, 1936.

Anacrusis (Gk, 'striking up'), term in prosody used of an extra syllable prefixed to the normal rhythm of a line, such as the 'and' in the second line of:

Till danger's troubled night depart
And the star of peace return.

Anadiplosis (Gk *ana*, back; *diploos*, double) is a figure of speech consisting of the repetition of a word from one clause at the commencement of the next, where it starts a fresh thought, as in the line from Keats: 'She dwells with Beauty—Beauty that must die.' See also **FIGURE OF SPEECH**.

Anadolu, see **ASIA MINOR**.

Anadyomene (Gk *anadyomai*, I rise

from the sea), surname of Aphrodite (or Venus), who had arisen from the foam of the sea. The birth of Aphrodite was a favourite subject of ancient art, and furnished Praxiteles with a theme for his famous Aphrodite of Knidos. So too Botticelli.

Anadyr': 1. Riv. in NE. Siberia, rising in the Kolyma Mts and flowing E. into the A. Gulf of the Bering Sea. Its length is 730 m.

2. (until 1930's *Novo Mariinsk*) Russian settlement at the mouth of the above, administrative and cultural centre of the Chukchi (q.v.) National Dist.

Anaemia, deficiency of the red corpuscles and/or haemoglobin. Thus it may be a deficiency of quantity or quality. A. may be local, due to interference with blood supply to a part from pressure on an artery or from a blocking of it by embolism (q.v.), spasm, etc., or general.

Local A. is referred to as *ischaemia*. The term A. is as a rule applied to a general deficiency. Strictly speaking, A. is not a disease. It is a symptom either of a fault in the blood-forming mechanism, when it is known as primary A., or of iron deficiency when it is known as simple A., or of some intercurrent disease not directly associated with the blood, when it is known as secondary A. The commonest form of primary A. is *pernicious A.* or, as it is sometimes called, *Addisonian A.*, after Thomas Addison (q.v.) who first described the condition in 1855. It is now estab. that pernicious A. is due to the absence of secretion in the gastric juice of hydrochloric acid and of what is known as the intrinsic factor (see GASTRIC JUICE). The intrinsic factor normally combines with the extrinsic factor contained in the food to form the anti-pernicious A. factor, which is stored in the liver and acts as a stimulant to the blood-forming tissues in the bone marrow. Before the true aetiology of pernicious A. had been elucidated Minot and Murphy in America had already discovered, in 1926, the therapeutic properties of liver in this disease. There are now available various highly concentrated extracts of liver which, given in combination with hydrochloric acid by mouth, replace the missing anti-A. factor and keep the disease under control, although not curing it. The symptoms of pernicious A. are increasing shortness of breath, pallor of the mucous membranes, a lemon-yellow tint to the skin, a smooth tongue, and dyspepsia. The diagnosis is proved by pathological examination of the blood. In advanced untreated cases of pernicious A. there may be signs of degeneration of the nerve fibres of the spinal cord. A.s of a similar kind to pernicious A. may be associated with a tropical disease known as sprue, with cancer of the stomach, and occasionally with pregnancy.

Simple A. may be due to lack of iron in the diet, failure to absorb iron through the intestine, or due to blood loss. A normal diet contains sufficient iron for ordinary needs (see NUTRITION), but in pregnancy the demands are greater and for this reason the diet of pregnant women

is usually supplemented with iron in the form of ferrous sulphate or iron and ammonia citrate mixture. It is difficult to estimate the degree of A. purely from the patient's appearance. Many pale people are not anaemic, while others with a good colour are. The colour of the mucous membranes is a better guide. The only true test of A. is an estimation by pathological examination of the number of red cells and the amount of haemoglobin (see BLOOD). Blood loss may occur from a sudden large haemorrhage due to accident, disease, or operation, in which case it is usually treated by blood transfusion (q.v.), or it may occur from small continual losses of blood such as from a slowly bleeding peptic ulcer, a cancer, or excessive loss at the menstrual periods. **Secondary A.** is due to a number of diseases which have no direct association with the blood or bone marrow but which cause diminished production of red corpuscles. Of these diseases infections are the commonest cause of A., particularly chronic infections. *Uraemia* (q.v.), *rheumatoid arthritis* (q.v.), and *myxoedema* (q.v.) are other notable conditions causing secondary A. Certain drugs and poisonous substances cause A. Benzene inhaled from rubber solutions, dry-cleaning fluids, paints and varnishes, and motor spirit may act in this way when exposure to them is prolonged. The treatment of secondary A. is to treat the cause where possible and give the appropriate iron therapy.

Anaesthesia, condition of partial or complete insensibility, particularly to touch. It occurs in connection with diseases of the nerve centres, and is artificially induced for the purpose of conducting surgical operations.

The influence of certain substances in procuring some amount of insensibility to pain has been known for centuries, and there is evidence that opium, mandragora, and other drugs have been used on various occasions to lessen the sufferings attendant on surgical operations. In 1800 Sir Humphry Davy suggested the use of nitrous oxide, or 'laughing gas,' for operations where there was little effusion of blood, and at the beginning of the 19th cent. many observers remarked on the possibility of using the anaesthetic properties of ether in surgical operations. In 1847 the use of ether became general in England and America, and in Nov. of the same year chloroform was introduced by Sir James Simpson, and for a time entirely superseded ether. Other anaesthetics, such as ethyl chloride, were tried and abandoned, and chloroform held the field until recent years, when the value of other anaesthetics and mixtures used under certain conditions has become better understood and recognised.

The chief anaesthetics in use for general A. at the present time are nitrous oxide, nitrous oxide mixed with oxygen, ether, chloroform, ethyl chloride, chloroform-ether mixture, trichlorethylene, and the intravenous injection of barbiturates such as thio-pentone; eucaine, novocaine, and

cocaine for local A.; and stovaine, tropococaine, and novocaine for spinal analgesia.

Nitrous oxide (N_2O) is used for short operations, such as occur in dental practice, and is practically free from danger and painful after-effects. It is supplied in a liquid state in steel cylinders, the cylinder being connected by means of a rubber bag to a face-piece designed to cover the nose and mouth. The period of induction is usually less than 1 min., and that of A. about 40 secs. The patient's eyes have a fixed appearance, and there is usually a duskeness of the face. Nitrous oxide combined with oxygen is now used for prolonged surgical procedures. This is made possible by the administration at the same time of analgesic and relaxant drugs such as morphine and curare.

Ethyl chloride ($\text{C}_2\text{H}_5\text{Cl}$) is used as a substitute for nitrous oxide in short operations, such as the removal of adenoids, but it is not considered so safe. The after-effects often include headache and sickness.

Ethyl ether, ($\text{C}_2\text{H}_5\text{O}$), is commonly used for operations of long duration. In the open method the ether is dropped on a gauze mask which is held at first some distance from the face and gradually brought nearer. By the use of a bag and facepiece, such as Clover's inhaler, A. is more quickly brought about. Ethyl chloride and ether are frequently used in sequence.

Chloroform (CHCl_3) is administered at first in a dilute form and the percentage gradually increased, the supply of air and vapour being of course thoroughly under the control of the anaesthetist. Dangerous after-effects occasionally occur, and its administration is highly dangerous where the *status lymphaticus* exists. In cases where chloroform or ether may not be advisable a mixture of 2 parts of chloroform to 3 of ether is often used, and is generally considered a safe and convenient anaesthetic.

Thiopentone and *Hexobarbitone*, ultra-short-acting barbiturates (q.v.), and others of the same group of barbiturates are used for A. for minor operations or for inducing A. before proceeding to inhalation A. for major operations.

Local A. or analgesia is chiefly employed in superficial operations or where special circumstances make general A. inadvisable. Sometimes ether or ethyl chloride is sprayed on the skin until it freezes. Insensibility is produced for a short time and is only superficial. There is likely, too, to be considerable pain when the skin thaws. Cocaine is often injected for cutaneous and subcutaneous analgesia, but its use is attended with some disadvantages. It has a dangerous effect when absorbed into the general circulation, and there is also a risk of a cocaine habit being formed. Eucaine and novocaine are very effective analgesics, and have no dangerous by-effects.

Spinal analgesia. There are sometimes occasions for serious operations when respiratory affections, alcoholism, diabetes,

and other conditions make general A. inadvisable. If the operation is concerned with the lower part of the body, it is possible by a spinal injection to produce insensibility to pain in that part whilst general consciousness is maintained. Stovaine or novocaine is injected into the spinal fluid while the patient is in a sitting position, if that position is possible. The method has been used more on the Continent than in this country, where it is looked upon only as a substitute for general A.

Instead of administration by inhalation, some anaesthetics can be used by injection into the rectum, or by injection into a vein. Among drugs used by intravenous injection are derivatives of barbituric acid. See BARBITURATES.

Trichlorethylene ($\text{CHCl}_2\text{CCL}_2$), known as *Trilene*, a variant of chloroform, but less potent and less toxic. It has long been used in industry as a rubber solvent and for dry-cleaning. Vaporised accidentally it was found to induce unconsciousness and has since been used as an anaesthetic, particularly in obstetrics. A new pocket trilene inhaler, made for the purpose of deadening pain, may prove to be a great improvement on the morphine tubes equipped with hypodermic needle which were used widely for the same purpose in the recent war. Exhaustive tests have shown that it is successful with 85 per cent of persons.

In general, successful A. depends to a great extent on the proper preparation of the patient. The stomach should be empty at the time of the operation, so that no food can be forced up to lodge in the respiratory passages. It may be said that with modern appliances and mixtures in the care of a trained anaesthetist the risk is comparatively slight.

Owing to the use of supportive drug therapy it is now possible to keep a patient anaesthetised during an operation lasting many hours, with a minimum dosage of anaesthetic agent. The new techniques of hypothermia and 'artificial hibernation,' in which the patient's body temperature is so lowered that its metabolic needs are reduced to a minimum, enable extensive operations to be carried out with comparatively small amounts of anaesthetic, and consequent benefit to the patient. See also SURGERY.

Anagallis, genus of Primulaceae growing in all continents but Australia. *A. arvensis*, the Scarlet Pimpernel (q.v.), or Shepherd's Weather-glass, and *A. tenella*, Bog Pimpernel, are native to Britain. *A. linifolia*, Mediterranean, is a popular garden ann.

Anagni (anct **Agnesia**), It. tn in Lazio (q.v.), 12 m. NW. of Frosinone (q.v.). It was an important tn in Rom. times, and has been a bishopric since 487. The cathedral dates from the 13th cent., and there are remains of a palace of Pope Boniface VIII. Pope Adrian IV (q.v.) d. here. Pop. 14,900.

Anagram (Gk *ana*, back; *gramma*, letter), word or sentence made by rearranging the letters of another; to be effective the new coinage should have

some appropriate connection with the original. One of the most celebrated is the traditional retort to Pilate's scoff, 'Quid est veritas?' (What is truth?) with 'Vir est qui adest' (It is the man who is here). Caliban, the monster in Shakespeare's *Tempest*, is an A. of 'cannibal,' oftenspelt with one 'n' in those days. And John Bunyan pointed out to his readers that the letters of his name could be rearranged to read 'Nu hony in a B' (I and J being of course interchangeable). A.s on writers' names have often been used for pseudonyms; John Taylor, the 'Water Poet,' wrote under the name Thorny Allo, and George MacDonald signed himself Dalmocand.

Anah, in on the Euphrates in the Bagdad vilayet, Iraq. Its position in the desert made it an important resting-place. It contains the remains of 4 ancient castles.

Anahita (Anaitis), goddess of sacred waters, fertility, and war, once worshipped by the Persians in association with Mithras. Her worship spread throughout the Persian Empire, and in Asia Minor she was identified with Cybele. See also ZOROASTRIANISM.

Anáhuac, geographical region of Mexico. The name was applied by the Aztecs to their whole kingdom, but its boundaries are not definitely known. The term is applied to the whole region, from Rio Grande to Tehuantepec, but it is more properly used of the plateau valley of the city of Mexico, between 18° 4' and 20° 3' N. lat., having a mean elevation of 7500 ft. This region was formerly largely covered by lakes, which fits the meaning of the name 'near the water,' and is a prin. granary and stock-raising centre of the country.

Anak, ancestor of the Anakim (Deut. ix. 2) (see ANAKIM). Etymologically it is a common noun, meaning 'necklace' (Song of Solomon, iv) or perhaps 'neck' (Arabic 'ung, neck; 'anaqa, to embrace). If this be the correct derivation, the name *bene 'Anaq* meant literally 'sons of the neck' or 'giants.'

Anakim, O.T. term for a section of the pre-Israelitic inhab. of Canaan, a race of fabulous giants, the sons of Anak (q.v.), living in the mountain range of S. Palestine and in the Philistine cities (Joshua xl. 21 ff.), where one of them later was the giant Goliath. They were conquered by Joshua. The A. are also called descendants of Arba (Joshua xiv. 15; xxi. 11). Their chief stronghold was Kiriath-Arba, afterwards called Hebron.

Analekts, Analekta (Gk *analekta*, things gathered), literary gleanings, term used to denote a collection of extracts.

Analekts of Confucius, see CONFUCIUS.

Analeptics (Gk *analeptis*, restoration), restorative medicines or agents.

Analgesics, see ANAESTHESIA and ANODYNES.

Analogy (Gk *analogia*, proportion): 1. Term which originally implied an equality of ratios; but though ancient writers used it in this sense, and it still has this meaning in mathematics, it is now used in many depts of learning to signify resemblance

which falls short of absolute identity. In inductive logic it forms the basis of most hypotheses, but is subject to much fallacious reasoning. The reasoning runs on such lines as these: A and B resemble each other in possessing one or more similar characteristics; A possesses a certain additional characteristic, and B therefore probably possesses it also.

A. can never afford proof; at best it is but a suggestion for a good hypothesis. Metaphorical language may be a source of incorrect reasoning by A., e.g. in speaking of a country as being a mother-country and from this arguing that the duties of the country towards the individual should be those of a mother towards her child. See J. S. Mill, *System of Logic*, 1875; W. S. Jevons, *Principles of Science*, 1877; J. M. Keynes, *A Treatise on Probability*, 1921; J. Cook Wilson, *Statement and Inference*, 1926.

2. In biology, term applied to organs which perform the same functions, and may be superficially similar, but differ essentially in structure and origins. The wings of a bee and of a sparrow are analogous, and the leaf-like branches of butcher's broom are analogues of the leaves of ordinary plants. See HOMOLOGUE.

Analysis (Gk *ana*, up; *luen*, to loose), in philosophy, implies the mental act of unloosening some unity into its component parts, e.g. the dissection in thought of a man into his various attributes of height, weight, reasoning powers, and so on. Synthesis is its complement, and implies the converse process of knitting together the parts to form the unity, e.g. the description of his various attributes, until the man is complete. A. plays a great part in inductive logic, for it opens with the complex of experience and resolves it into the elementary relations realised in it. In this way it is largely experimental and leads to discovery. The propositions set forth in geometry illustrate this; they are, however, usually synthetic in proof, but the *reductio ad absurdum* (q.v.) is wholly analytical.

Analysis, Chemical, the determination of the elements comprising a compound or a mixture of compounds. For inorganic compounds or mixtures the methods may be divided into dry and wet A. Dry methods usually only give an approximate result, and should be supplemented by wet methods, if possible. The chief processes in a dry A. comprise heating to determine what sublimate is formed, what gas is evolved, or what water of crystallisation given up, or whether any of the substances are oxidised. Heating on charcoal in a reducing flame would possibly give a metallic globule or other indications, and heating with borax on a platinum wire in an oxidising flame produces beads of different colours characteristic of the various metals. The flame test consists in heating a small portion moistened with hydrochloric acid in the high-temp. area of a Bunsen flame, when a characteristic colour may be imparted. Such methods obviously give

only a general idea of the constituents of the mixture or compound; some elements may be masked by others unless a spectroscope (q.v.) be employed, when the presence of different elements in a flame test is very accurately indicated.

Wet methods consist of treating the given compound or mixture with reagents in a systematic manner, so that by the nature of the reactions produced certain groups of elements are indicated, further tests subdividing these groups and so on until the original compound is split up into the simplest possible forms. Such an A. is called qualitative, because it takes no account directly of the relative proportions of the constituents. If those proportions be required, quantitative A. must be employed, which may be either gravimetric, volumetric, or colorimetric. In gravimetric methods it is designed to obtain a precipitate of known composition from a weighed quantity of the compound. This being carefully filtered, dried, and weighed, a simple calculation gives the percentage of the required element in the original mixture. Occasionally electrolysis of the given solution is resorted to, the amount of metal deposited on the cathode indicating the strength of the solution. Volumetric methods aim at determining the strength of a solution of the substance by finding what quantity is required to bring about a certain definite reaction with another solution of known strength. Certain elements which give well-defined colour reactions with other substances can be determined quantitatively by comparing the colour produced by known weights of the substance with that produced by a standard solution.

The A. of organic compounds proceeds upon entirely different lines. If on burning a small quantity an ash or residue is left, the substance probably contains an inorganic impurity, which may be separated by the use of solvents, such as alcohol, ether, benzene, chloroform, etc., one or another of which dissolves the majority of organic compounds, when filtration and subsequent crystallisation in fractions may effect still further separation. Fractional distillation—that is, distilling at different temps.—is useful in separating liquids whose boiling-points are markedly different. The elements composing organic substances can be detected by characteristic tests: carbon by the formation of carbon dioxide turning lime-water turbid; hydrogen by the formation of water on decomposition; halogens by heating with sodium, when a sodium halide is formed; nitrogen by the evolution of ammonia on heating with lime; sulphur and phosphorus by oxidising to acids on heating with a mixture of potassium carbonate and nitre. The general principle underlying the quantitative determination of these elements is the collection and weighing of the products of combustion of a definite quantity of the substance. In recent years, accurate methods of qualitative and quantitative A. of very minute quantities of substance have been worked out

(micro-analysis), e.g. by F. Pregl, and these methods have proved exceedingly useful and important in biochemistry, where the amount of material available for A. is often extremely small.

Modern research on the structure of the atom has led to the development of analytical methods based on electrical phenomena, and these enable us to detect even a trace of a particular element in the presence of large quantities of others. See F. Sutton, *Volumetric Analysis*, 1924; Treadwell and Hall, *Analytical Chemistry* (2 vols.), 1924; Thorpe and Whitley, *Manual of Organic Chemical Analysis*, 1926; A. I. Vogel, *Text Book of Qualitative Inorganic Analysis*, 1939; A. I. Vogel, *Text Book of Qualitative Chemical Analysis*, 1937; A. J. Berry, *Qualitative Inorganic Analysis*, 1938; H. Middleton, *Systematic Qualitative Organic Analysis*, 1939; N. J. Allport, *Colorimetric Analysis*, 1945.

Analyst, Public, official appointed by a co. or bor. council under the provisions of the Food and Drugs Acts, 1875 and 1899, for the purpose of analysing samples of food and drugs and agric. products exposed for sale. The appointment must be confirmed by the Ministry of Health or the Board of Agriculture, and cannot be annulled without the assent of the dept concerned. By the latter Act both depts are empowered to appoint a P. A. where the local authority has failed to do so. The P. A. is generally a F.I.C. (Fellow of the Institute of Chem.). For his duties see ADULTERATION.

Analytical Geometry, see GEOMETRY.

Analytical (also known as **Explicative or Essential**) **Propositions** are those which affirm of their subject a predicate which is already contained in the definition of the subject. Such a proposition is 'A parallelogram has four sides and four angles,' the having four sides and four angles being part of the definition of a parallelogram. A. P. are distinguished from *synthetical* propositions, which affirm of their subject a predicate not already contained in the definition, such as 'A parallelogram is a schoolboy subject to the unintelligent schoolboy.'

Anamalai, or Annamullay, Hills, group of mts forming part of the Sahyadri range, S. India, about 65 m. S. of the Nilgiri Hills. The highest peak, Anamudi, is the loftiest point in S. India, attaining an elevation of 8840 ft. Tea and coffee are extensively grown here, and there is abundance of teak timber and wild beasts, such as the elephant and bison.

Anambas Islands, group of 3 small wooded and rocky is. in Indonesia, between Borneo and Malacca.

Anamnesia (Gk *ana*, again; *mnēsis*, memory), term used in medicine to signify the recollection of a patient or his friends of the first symptoms and past hist. of his case.

Anamur, or Anamour, Cape, is the most S. point in Asia Minor. It is named from A., the anct Anemurium, in which there are ruins of tombs and 2 theatres. A. Castle is 6 m. E. of the cape.

Ananas, genus of Brazilian herbaceous perennials, family Bromeliaceae. A.

comosus, the pineapple, is the host-known species; for a description of its fruit see PINEAPPLE.

Ananias, name borne by 3 characters in the N.T. and 1 in the O.T.: (1) Jewish name of Shadrach (cf. Daniel i. 7 and the Song of the Three Children (Benedicite)). (2) A Jewish Christian at Jerusalem, who, with his wife Sapphira, fell dead when rebuked by St Peter for falsely pretending to give all their property to the community (Acts v.). (3) A Jewish Christian elder of Damascus, who received St Paul after his conversion, restored his sight, and baptised him (Acts ix.). (4) The Jewish high priest, son of Nedeбалos, who was at the trial of St Paul before the Sanhedrin at Jerusalem and at Caesarea (Acts xxiii, xxiv.).

Anapaest, in poetry, a metrical foot, consisting of 2 short, or unaccented, syllables followed by a long, or accented, syllable. It is the opposite of the dactyl (q.v.) and is sometimes called the anti-dactyl. Examples are 'colonnade,' 'interrupt.' The A. was often employed in Gk and Rom. poetry, but its employment in England is largely restricted to the lighter forms of verse. In France the use of the A. is very general, forming indeed one of the marked characteristics of Fr. poetry. Aristophanes among the ancients, and Swinburne in our time have employed the A. with good effect.

Anaphora (Gk *ana*, back; *pherein*, to carry) is the repetition of a word or phrase in successive clauses, as in *Judges* v. 27: 'At her feet he bowed, he fell, he lay down: at her feet he bowed, he fell: where he bowed, there he fell down dead.' See also FIGURE OF SPEECH.

Anapl., see NAUPLICH.

Anarchism (Gk *alpha*, privative; *archē*, rule). A. may be defined as the negation of gov., as a state of society without a central gov., and in which individual autonomy is allowed its fullest development. The term *anarchy* is also used to imply the state of turmoil accompanying the weakening of central gov.

Anarchists have attempted, by means of international conferences, notably that of Amsterdam, 1907, to define their position. In a negative way their difference from the Socialists was made plain by the expulsion of the Anarchists, led by Bakunin, from the International (see THIRD INTERNATIONAL) at The Hague Conference, 1872. Many of the tenets of Socialism are held by Anarchists. Since they believe that the freedom of the individual is restricted by the monopoly of land and capital, the Anarchists are at one with the Socialists in the desire to overthrow it, but they differ fundamentally on the question in whom property should be vested, and on the governance of the remodelled society. The State Socialist's remedy is more gov., and better gov.; the Anarchist holds that all gov., however well intentioned, are bad and tend towards privilege and oppression, and that the individual is just as much a slave if he has unwillingly to conform to the majority as if he conforms to a

despot. His views are crystallised in the sentence, 'That gov. is best which governs least,' and in this conclusion he is not far removed from such individualists as Herbert Spencer, Auberon Herbert, and Harold Cox.

The modern Anarchist movement may be said to have begun with Pierre Proudhon (1809-65), although an atmosphere favourable to its reception had been created by the writings of the poet Shelley and the Fr. Encyclopaedists. Proudhon's most celebrated work is *What is Property?* in which he equated property with 'theft.' He asserted that in a perfect society order would be maintained by the reasonable self-control of the free individual. Since his time perhaps the greatest Anarchist was Mikhail Bakunin, the Russian, the apostle Paul of A. (1814-76). In addition to writing many uncompromising works, including the atheistic *Dieu et l'État*, he is chiefly remembered for his prolonged struggle in the International with the followers of Karl Marx, the father of orthodox Socialism. From this struggle Marx emerged victorious, but Bakunin had a large following, especially among the Lat. states. In recent years A. has numbered among its supporters many men of considerable erudition. Prince Peter Kropotkin, a Russian, and Enrico Malatesta, an Italian, made England their home, and the former wrote many scholarly works on Nihilism (q.v.), a form of A., chief among them being *The Conquest of Bread*, 1892 (trans. 1906), *Fields, Factories, and Workshops*, 1899, and *The Memoirs of a Revolutionist*, 1899. The return to the simplicity of the primitive Christians advocated by Count Leo Tolstoy has given rise to the term Tolstoyan anarchy. Prominent Fr. Anarchists include Élisée Reclus, Sébastien Faure, Charles Malato, and Louise Michel; It., Amilcare Cipriani; Sp., F. Ferrer; Amer., Emma Goldman and Benjamin Tucker. 'Propaganda by deed,' repudiated by some Anarchists, is the violent attacks made upon rulers and sometimes indiscriminately on the better-off members of society, the *bourgeoisie*, by pistol, knife, and bomb. A. has a long list of crimes to its 'credit.' Britain's comparative immunity from these attacks has been attributed to the fact that it has no exceptional laws directed against A. Among rulers to perish by the hands of Anarchists are President Carnot of France, 1894; Empress Elizabeth of Austria, 1898; King Humbert of Italy, 1900; and President McKinley of U.S.A., 1901. Ravachol, 1892, Vaillant, 1893, and Henry, 1894, were all executed in Paris for bomb outrages on the public. See INDIVIDUALISM.

Anarrhichas, genus of percomorph fishes, very closely allied to the blennies. They have round, smooth, blunt heads; elongated bodies, covered with minute scales; a single long dorsal and an extended anal fin, both separated from the caudal; no ventrals; the mouth armed with formidable crushing teeth. One species, the wolf-fish, sea-cat, or cat-fish, *A. lupus* of Linnæus, is common in the N. seas

and off the E. coast of Scotland and the Orkneys.

Anas, see GUADIANA.

Anas (Lat.), scientific name for a duck (q.v.).

Anasarca, dropsy of the subcutaneous cellular tissue.

Anaspids, fossil jawless ostracoderms (q.v.) from Silurian and Devonian rocks. The head is usually covered with small bony plates and the body with scales, and there is a reversed heterocercal tail fin. In some forms the armour is reduced.

Anastasius, pope (399-401), chiefly remembered by his opposition to the writings of Origen, whose advocate, Rufinus, he excommunicated.

Anastasius I, surnamed Dicorus, Byzantine emperor, 491-518, b. c. 430 at Dyrrachium. He succeeded Zeno, whose widow, Ariadne, he married. He ruled with great energy and justice. His reign was marked by the Isaurian (492-6) and the Persian wars (502-6), and by invasions of Slavs, Huns, and Bulgarians. **Anastasius II**, surnamed Artemius, Byzantine emperor, 713-716. He was deposed by a mutiny of the navy, which proclaimed Theodosius III in his place. A. became a monk in Thessalonica, but later headed a revolt against Leo, the successor of Theodosius, and was put to death.

Anastomosis, intercommunication of blood-vessels, so that the supply of blood to any part of the body is not wholly dependent upon one channel; it is particularly free around joints. The term is extended to apply to the estab. of a communication between 2 hollow parts, or 2 different portions, of the same organ.

Anata, vil. of Palestine, 3 m. NE. of Jerusalem. It is supposed to occupy the site of the anc. Anathoth, the bp. of Jeremiah. It possesses various anc. remains.

Anatase (Gk *anastasis*, extension), or **Octahedrite**, also called **Oisanite** and **Dauphinite**, is a mineral form of titanium dioxide. The crystals have either many pyramidal faces or occur as simple acute double pyramids. They are found in granite crevices in Switzerland and Le Bourg d'Oisans in Dauphiné.

Anathema, literally 'that which is set aside, or offered.' Used by the Greeks in respect of gifts made to the gods either in gratitude or for propitiation. As animals so offered were condemned to death, the word has gained a secondary sense of perdition. The word A. was used by the Catholic Church as part of the formula in the excommunication of heretics. In 1 Cor. xvi. 22 occur the words: 'If any man love not the Lord Jesus Christ, let him be Anathema. Maran-atha.' The word Maran-atha has for this reason erroneously been thought to be an amplification of the curse, but its meaning is merely 'the Lord cometh.'

Anatidae (Lat. *anas*, duck), family of web-footed birds belonging to the order Anseriformes. It includes swans, geese, and ducks among its 150 or so species.

Anatolia, 'Land of the Rising Sun' or Orient, the Gk name for Asia Minor. See ASIA MINOR and TURKEY.

Anatolike, or **Aetolikon**, tn of Greece, built on an is. 6 m. N. of Missolonghi, and connected with the mainland by causeways on either side. It exports fish and oil, and cultivates the vine and olive. In 1881 there was a violent eruption of sulphuretted hydrogen in the lagoon. Pop. 4400.

Anatomy, study of the form or structure of a living thing. Thus there are 2 prin. divs., vegetable A. and animal A. If the latter is concerned with the structures of various classes of animals as compared with one another it is called *Comparative A.* When one particular species of animal is the object of study the science is called *Special A.*, of which *Human A.* therefore forms a branch. It is in this latter sense that the term 'anatomy' is generally applied. It consists in the observation of the form of the various organs and tissues, the materials of which they are composed, and their possible variations, as distinct from physiology, which deals with the functions of those parts. Thus the work of the anatomist is to investigate and describe the shape, size, position, and construction of organs, etc.; he will, for instance, describe the various parts of the liver, the substances of which it is composed, and the position of the liver with regard to other organs, whilst the physiologist will deal with the problem of how the liver makes bile, and how the work it does affects the constitution of the blood and the whole process of nutrition. *Human A.* itself is a wide subject, to be approached from sev. points of view, and the investigation of a single part has provided a lifelong study for many a scientist. *Descriptive A.* is a study of the separate and individual parts in the body, apart from their relationship to surrounding parts; *Microscopic A.* deals with facts gleaned from microscopical examination; *Morbid or Pathological A.* is a study of diseased or abnormal structures; and *Practical A.* deals with the body as a subject for dissection. *Artistic or Surface A.* is an allied subject, and deals with the position of the various structures only so far as they affect the outward appearance for the purpose of representation by painting, sculpture, etc.

The organs may be classified according to function into systems, as the *skeletal system*, comprising the bones and ligaments; the *muscular system*; the *respiratory system*, comprising the lungs, wind-pipe, diaphragm, etc.; the *circulatory system*, comprising the heart and blood-vessels; the *alimentary system*, comprising the stomach, intestines, liver, and all those organs concerned with nutrition; the *excretory system*, comprising the kidneys, bladder, etc.; the *reproductive system*, comprising the ovaries, testes, etc.; and the *nervous system*, comprising the brain, spinal cord, nerves, and organs of sense. The organs are composed of tissues, of which the epithelial, the connective, the muscular, and the nervous tissues may be taken as the prin. groups.

The introduction of radiography into medical science has been of benefit not only to the physiologist but also to the

anatomist. In the *living body* the anatomist is now able to study the interdependence of various organs during life, to find out where weight is exerted in natural circumstances, to discover at what age and at what precise points ossification of the bones takes place; and he is also enabled to determine the normal positions of such organs as the heart and the stomach while performing their ordinary functions.

When an X-ray photograph has been taken of the bones, the shadow picture is made clear because of the solidity of the bones, but where the stomach is under review a 'test meal' of some such nature as porridge mixed with the innocuous and tasteless carbonate of bismuth is administered to make the organ opaque to the anatomist. By the injection of compounds of iodine into the lungs, and of oxygen into the brain, these organs are also enabled to show up clearly in the X-ray photographs.

See also MORPHOLOGY.

Consult A. M. Buchanan, *Manual of Anatomy* (8th ed.), 1949, and H. Gray, *Anatomy. Descriptive and Applied* (31st ed.), 1954.

Anatta, Anatto, see ANOTTO.

Anaxagoras (c. 500-428 BC), Gk philosopher, b. Clazomenae, Ionia. About 464 he went to Athens and taught there for 30 years, among his pupils being Pericles, Euripides, and perhaps Socrates. He exerted great influence, both on account of his mathematical and astronomical wisdom and the ascetic dignity and strength of his character. His attempts to explain physical phenomena by natural means laid him open to the charge of impiety. He was acquitted after being defended by Pericles, but left Athens for Lampsacus on the Hellespont, where he d. The physical theory of A. assumed an original 'mixture' which contained the 'seeds' of all natural substances; from this mixture identifiable substances were separated out by the action Nous (mind). Many strange opinions on physical philosophy are attributed to A. He said that the sun was a mass of hot iron larger than the Peloponnesus: the opinion that the moon derived her light from the sun is probably not his own. Fragments of A.'s single work *On Nature* have survived. See H. Diels, *Die Fragmente der Vorsokratiker* (6th ed.), 1952; J. Burnet, *Early Greek Philosophy* (4th ed.), 1948; J. Zafiropulo, *Anaxagore de Clazomène*, 1948.

Anaxarchus of Abdera (4th cent. BC), Gk philosopher of the school of Democritus (q.v.). He accompanied Alexander the Great into Asia (334 BC). After Alexander's death (323 BC) A. was shipwrecked on the coast of Cyprus where the vicerey Nicocreon, whom he had offended, had him pounded to death in a stone mortar. He is reported to have cried out 'You may crush my body, but not my soul.'

Anaximander, Gk philosopher (610-c. 545 BC), b. Miletus in Ionia. He was a pupil of Thales (q.v.), and explained the world as having developed from a first

principle which he called 'the Indeterminate.' Besides drawing the first map of the world, A. wrote the first Gk prose treatise, of which a few short fragments are extant. See J. Burnet, *Early Greek Philosophy* (4th ed.), 1948.

Anaximenes (fl. mid 6th cent. BC), Gk philosopher, b. Miletus, Ionia. Said to have been a pupil of Anaximander. He considered air to be the source of all matter, from which it (matter) was formed by condensation and rarefaction.

Ancash, coast prov. of central Peru. It lies partly in the Cordilleras, partly in the Marañon R. valley, and partly on arid Pacific coast land. It produces wheat, barley, coffee, and tropical fruits. There are lead-, copper-, silver-, and gold-mining industries. Cap. Huaráz. Area 14,705 sq. m.; pop. (1950), 554,000.

Ancaster, vil. of Lincs, England, 6 m. W. of Sleaford. Lying on the Rom. Ermine Street, it was the last Rom. station (*Causennae*) before Lincoln, the camp covering some 9 ac. Here, and at nearby Wilsford, is quarried A. stone, a quickly hardening limestone. Pop. 800.

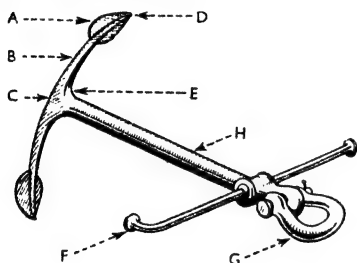
Ancenis, tn, dept. Loire-Inférieure, France; situated on the Loire, 21 m. NE. of Nantes. Pop. 4800.

Ancestor Worship, feature of many religions. The line of demarcation between gods and men is clearly and distinctly drawn in Greece: the worship of heroes was a prominent feature of Gk religion, but this did not lead to deification except in rare cases, e.g. Hercules (see also EUHEMERUS). The same is true of Rom. worship. Spirits of the dead, *manes*, were worshipped with a ritual distinct from that bestowed on the gods. Access to their abode in the underworld was obtained through the *lapis manalis*, a stone covering a pit; and they were regarded as eating and drinking. A. W. is the basis of religion in China and Japan. The Hindus also attach great importance to the power of departed spirits, and believe that all their actions are watched by these deities. A. W. is a characteristic of the religion of many primitive peoples, in particular those in which the basic communities of the society are composed of kinsmen descended from a common ancestor: the dead kin of the group are worshipped, sacrifice being the occasion of communion between living and dead members.

Anchises, son of Capys and Themis, the daughter of Ilius, and King of Dardanus on Mt Ida. He became the father of Aeneas by Aphrodite. He was struck by lightning and became blind for having boasted of his intercourse with the goddess. When Troy was captured A. at first refused to leave, but was at last persuaded by Aeneas, who carried him on his shoulders from the burning city (see Virgil's *Aeneid*, ii). A. d. soon after Aeneas arrived in Sicily, and was buried on Mt Eryx.

Anchor, instrument used for the purpose of fixing the position of a ship by fastening it temporarily to the bottom of a riv. or sea. The word is derived from the Gk *ankura*, meaning a hook.

By its use drifting with currents, tides, and wind is prevented. The A. is attached to the ship by a cable. It is of early origin, though the primitive forms it took were not more scientific than large stones or sacks of sand. The first hook A. has been traced to the Greeks. The diagram illustrates the modern type of A. A sea A. is a floating A. somewhat like a stout parachute, trailed in the water behind the vessel to retard its movement, and used where anchorage to the bottom is impracticable. The grapnel is a small A. with 4 or 5 flukes. The A.s used by the Admiralty bear no stock, and have movable blades so arranged that they grip the bed of the sea irrespective of any position the A. may assume. This type is known as the Wasterneys-Smith.



ANCHOR

A, palm blade (or fluke); B, arm; C, crown; D, bill (or pea); E, trend; F, stock; G, shackle (or eye, or ring); H, shank.

Anchor Ice (Ground Ice), form of ice which adheres to the bottom only of those waters which are characterised by a never-ceasing tempestuous motion. The ice is very porous, and as it rises it often brings to the surface any matter to which it may be adhering. It forms only in a temp. lower than 10° F. Until zero its adherence to the bottom is not of any strength.

Anchorage. In special areas, a fee is chargeable to the captains of vessels who wish to anchor. Generally the ownership of the area is restricted to the state which receives the toll, but sometimes private companies and, rarely, separate individuals own the reserved water. The word also means anchor-ground, i.e. a bed composed of stiff clay or firm sand.

Anchorite, see HERMIT.

Anchovy, small fish belonging to the family Engraulidae and related to the herring family (Clupeidae). A.s are distinguished from the latter by the pointed snout that projects in front of the mouth. The numerous species occur in coastal seas of the tropical and temperate regions.

Anchovy Pear, *Orias cauliflora*, family Lucythidaceae, evergreen tree of 30 to 50 ft of the W. Indies, with fragrant yellow flowers, followed by edible, brown, berry-like fruits.

Anchusa, family Boraginaceae, genus of

herbs found in Europe, Africa, and W. Asia. *A. officinalis* is the common Alkanet of Britain, sometimes used in dye manuf. *A. azurea*, and varieties, is a popular garden border perennial, from the Caucasus. See PENTAGLOSSIS.

Ancient Buildings, Society for the Protection of, see PROTECTION.

Ancient Demesne, term which signifies estates or manors vested in the king at the time of the Norman Conquest. Freedom from many of the prevalent duties binding upon tenants was a privilege attached to them; among these exemptions were freedom from the Danegeld, from tolls and duties, from fines, and from sitting on juries. The conditions attached to their ownership gave rise to the modern 'freehold' property.

Ancient Lights, see LIGHTS, ANCIENT.

Ancient Monuments, Act for the Protection of, see PROTECTION.

Ancient Weights and Measures, see METROLOGY.

Ancients and Moderns. The celebrated controversy between the A. and M. which raged in Fr. and Eng. literary circles at the end of the 17th and beginning of the 18th cents. centred on the respective merits of classical and modern literature. Though not the first protest against the worship of the classics, the *Traité pour juger les poëtes grecs, latins, et françois* of Desmarets de Saint-Sorlin, pub. in 1670, in which he attacks Homer and Virgil, and the work of the same author entitled *Discours pour prouver que les sujets chrétiens sont les seuls propres à la poésie héroïque*, may be said to have actually started the dispute. For these he received severe handling from Boileau in his *Art poétique*, 1674, to which Desmarets replied with his *Défense du poème héroïque*, 1674, and *Défense de la poésie et de la langue française*, 1675. Subsequently the cause of the Moderns found its chief champions in the brothers Perrault, who for many years kept up the dispute with such doughty opponents as Boileau and Racine. An important contribution to the case of the Moderns was Fontenelle's *Digression sur les anciens et les modernes*, 1688. In England the dispute commenced with the pub. of Sir Wm Temple's *Essay upon the Ancient and Modern Learning*, 1692, written from the classical side, and answered by Wotton's *Reflections upon Ancient and Modern Learning*, 1694. In his defence of classical literature Temple strangely enough found himself opposed to Bentley, the most brilliant classical scholar of the day, who secured a signal triumph in the controversy by proving the spuriousness of the *Letters of Phalaris*, upon which Temple had bestowed high praise. The outstanding literary contribution to the discussion is Swift's *Battle of the Books*, 1704, written in favour of the classical view.

Ancillon, Charles (1659–1715), Fr. Protestant historian, b. Metz, son of the famous Protestant minister, David A. His chief works are *L'Irrevocabilité de l'édit de Nantes*, 1688, and *Histoire de l'établissement des Français réfugiés dans le Brandebourg*, 1690.

Ancillon, David (1617-92), Fr. Protestant divine, *b.* Metz and *d.* Berlin. In 1641 he was licensed to preach by the synd. of Charenton, and appointed minister at Meaux. In 1653 he accepted a call to Metz, and officiated there until the revocation of the Edict of Nantes compelled him to retire to Frankfurt. He wrote works in defence of the new Protestant faith. See *Mélange critique de littérature recueilli des conversations du feu M. Ancillon*, Basel, 1698.

Ancillon, Johann Peter Friedrich (1767-1837), Prussian historian, of Fr. Huguenot extraction, *b.* Berlin. In Berlin he became tutor to the crown prince of Prussia. In 1832 he was appointed foreign minister. He is the author of *Révolutions du système politique de l'Europe*. The exceptional quality of his work lay in its stress on the psychological element in the great movements of hist.

Ancon, fishing port, resort, and road and rail point in the dept of Lima, Peru. Pop. 1100.

Ancona, Alessandro d' (1835-1914), It. man of letters, *b.* Pisa, educ. Florence and Turin. At the latter place he took a prominent part in the agitation preceding the war of independence and represented the Tuscan Liberal party. In 1859 he founded and for some time ed. *La Nazione*. In 1860 he was appointed prof. of It. literature at the univ. of Pisa. He ed. Dante's *Vita Nuova*, and various other works of early It. writers. Among his original works on literary and dramatic subjects may be mentioned *Sacre Rappresentazioni dei Secoli XIV, XV, e XVI*, 1872; *I Precursori di Dante*, 1874; *Origini del Teatro in Italia*, 1877; and *La Poesia popolare italiana*, 1878. In 1882 was pub. his autobiography, under the title of *Il Primo Passo*.

Ancona: 1. Prov. of Italy, in the central Marches (q.v.). In the NE. there is an undulating coastal plain on the Adriatic; the SW. contains ridges of the central Apennines (q.v.). The chief rivs. are the Misa, Esino, and Musone. The prin. tns include A., Senigallia, Osimo, and Fabriano (q.v.). Area 765 sq. m.; pop. 406,000.

2. (Gk *ankōn*, an elbow, referring to the tn's position on a promontory) It. seaport, cap. of the prov. of A., and chief tn of the Marches, 86 m. NNE. of Rome (q.v.). It is on the Adriatic, and was founded c. 390 Bc by refugees from Syracuse (q.v.). It suffered from the depredations of the Goths and the Saracens (q.v.). The tn was occupied by the French in 1797 and 1832, and by the Austrians in 1849. During both world wars it was bombarded. A. has a triumphal arch and a mole of Trajan's reign, and many splendid medieval buildings, including the 11th-13th-cent. church of Santa Maria della Piazza and the Palazzo del Comune (partly 13th cent.). The Romanesque-Byzantine archiepiscopal cathedral (11th-13th cents.) suffered damage (now repaired) during the Second World War, as did sev. other anct. buildings. The harbour of A. is one of the best on the

Adriatic, has a busy trade, and has been used as a naval base since the last cent. There are shipbuilding yards and engineering works. Pop. (tn) 52,600; (com.) 85,700.

Ancre, Concino Concini, Marshal d' (*d.* 1617), Florentine favourite of Marie de' Medici, second wife of Henry IV of France. He married Leonora Galigai, one of the queen's women, and with the co-operation of his wife succeeded in aggravating the unhappy relations between Henry IV and Marie. Upon the king's death he became Marshal of France, though possessing no military knowledge or experience. He was eventually assassinated.

Ancre, Battle of the. This battle was an extension of the great Somme battle of July to Aug. 1916. The Germans were entrenched near the riv. The actual attack began on 13 Nov., three Brit. divs. under Gough taking part, the 31st being foremost in the advance. Great losses were sustained by the 3rd Div. on the S. of the 31st Div. on ground between Serre and the riv., and some success was obtained by the 2nd Div. on the right of the 3rd; but the divs. which were operating further S. fared much better, capturing St Pierre Divion vil. and Beaucourt and clearing the enemy from the last trench system between the Brit. front and the riv. Co-operating with these infantry divs. was the 63rd Naval Div., which attacked N. of the riv. The riflemen then threw a pontoon across the riv. so as to link up with the 39th Div. on the S. The Ger. redoubt surrendered. The strongly organised and important vil. of Beaumont Hamel was taken; meanwhile the remaining divs. S. of the A., of Gough's Fifth Army, also advanced and, though suffering great losses, made a little headway in the direction of Grandcourt and Petit Miraumont. At dawn on 18 Nov. the new advance was begun, a little ground being gained, much of which was lost by a prompt counter-attack. This battle was the last combined operation of 1916 and is usually claimed as a Brit. victory.

Ancren Riwe (anchoresses' rule), prose treatise written in M.E. It dates probably from the early part of the 13th cent. It was designed for the guidance of three women who had taken the vows but belonged to no order, living in a hermitage at Tarrant Keynes in Dorset. Its authorship is uncertain. Its theme is the need for rigorous renunciation, though the severity of its tone is softened somewhat by the affectionate phrasing. It also contains an interesting account of the early Eng. Church doctrines.

Anorum, vil. on the Ale Water, a trib. of the Teviot, in Roxburghshire, Scotland. Its name is derived from *crom*, a bend, as it is situated on the bend of the Ale or Alne. In the vicinity is A. Moor, the scene of a battle between the English and Scots in 1545. Pop. 890.

Ancus Marcius, 4th legendary King of Rome (640-616 bc), and reputed grandson of Numa Pompilius (q.v.). Notwithstanding his peaceful inclinations, A. M. was obliged to make war on the Latins; and his settlement of some captives on

the Aventine hill was the supposed origin of the Plebeians. A. M. was said to have fortified the Janiculum, bridged the Tiber, founded the port of Ostia, estab. salt works, and built a prison. See Livy, i. 32, 33; Dion. Hal., iii. 36-45.

Ancylys (Gk *ankylus*, bent), genus of fresh-water snails, often called riv. limpets. They belong to the family Limnaeidae and order Euthyneura of the gastropod molluscs. Their lung-sacs always contain water, and they cannot breathe on land. They are found in springs and streams, adhering to stones and leaves.

Ancyra, anct city of Galatia on a trib. of the Sangarius. It was once a centre of the Tectosages, one of 3 Gaulish tribes who settled in Galatia in 232 BC. An important eccles. synod was convened there in AD 314. There too was discovered, in 1555, the celebrated Monumentum Ancyranum erected by the Emperor Augustus to record his acts between 44 and 28 BC. See ANKARA.

Andalucia (Eng. *Andalusia*), region in S. Spain, with coastlines on both the Mediterranean and the Atlantic. It comprises the provs. of Almería, Cádiz, Córdoba, Granada, Huelva, Jaén, Málaga, and Sevilla (q.v.), and is thought to be the biblical *Tarshish* (q.v.). In the 5th cent. it was overrun by the Vandals (whence, possibly, its name, from *Vandalitia*), and it was the last part of Spain to be taken from the Moors. Some of it remained in Moorish hands until the end of the 15th cent. The legacy of the Moors remains to-day in its famous cities, its customs, its music, and its dialectic language. A. is, in general, a great plain, lying largely in the basin of the Guadalquivir (q.v.). In the N. it is bounded by the Sierra Morena (q.v.), and it contains also the Sierra Nevada (q.v.). It is one of the most fertile and productive regions of Spain, and is celebrated for horses and mules, oranges and other fruits, wine (sherry), and copper from the mines of Rio Tinto (q.v.). Area 35,700 sq. m.; pop. 5,711,700.

Andalusia, see **ANDALUCÍA**.

Andalusite (from *Andalusia* in Spain), anhydrous silicate of alumina found in France, Spain, and N. America. It occurs crystallised in the ortho-rhombic system, usually in square prisms. In colour it is flesh-red to brownish, greyish-red, and violet.

Andaman Islands, group of is. in the Bay of Bengal. They number 204 and vary in size. Total area is 2500 sq. m. The main portion consists of 5 large is. so closely connected that they are called 'Great A.' Their names in order from N. to S. are N. A., Middle A., S. A., Baratang, and Rutland Isle. The 4 straits separating them are Austin Strait, Homfray's Strait, Middle Strait, and Macpherson Strait. The Little A. group to the S. has been used, since 1858, by the Gov. of India as a penal settlement for life and long-term convicts, but the practice is being discontinued as it has had a morally deleterious effect upon the natives. There were 6000 convicts there in 1941.

The British settled there in 1789, in the N. A. Is., but abandoned the place for Penang. The cap. of the present settlement is Port Blair, in S. A. Its harbour is one of the finest in the world. There are other harbours and safe anchorages, including Port Cornwallis and Bonington. The climate is warm, tempered by pleasant sea breezes and the modifying influence of the sea. The is. are densely wooded, and among the best-known timbers is A. red-wood (or *padank*). Coco-nut and rubber are successfully cultivated. There is wireless communication with Burma and Madras. Raided for the first time by Jap. bombers in Feb. 1942. Jap. forces occupied the is. on 23 Mar. 1942, but surrendered them in Aug. 1945. The aboriginal inhab. are famous in anthropology, as representing a simple hunting and gathering culture. The total pop. of the is. (excluding the aborigines) in 1941 was 21,500. See A. K. Radcliffe-Brown, *The Andaman Islanders*, 1922.

Andante (from It. *andare*, to go, to walk), in music, is one of the 5 prin. tempos, midway between *adagio* and *andantino*. It indicates a steady calm movement. It is often modified, as *A. maestoso*, slow and majestically; *A. cantabile*, slow, in a singing style; *A. ma non troppo*, which, however, is a solecism, since 'walking, but not too walking' is meaningless.

Andantino (It. dimin. of *andante*), in music, movement a little faster (originally slower) than *andante*.

Andaqui, formerly an important confederacy of highly civilised tribes occupying the head-waters of the Cauquetá and Magdalena R.s in S. Colombia.

Andelys, Les, Fr. tn in the dept of Eure, on the Seine. It is in two parts, the Petit-Andely, which is dominated by the magnificent ruins of Château Gaillard (q.v.), and the Grand-Andely, which has a very fine Gothic church, parts of which are 13th cent. The Grand-A. was very severely damaged in the Second World War. A. was the bp. of Nicholas Poussin, Brunel, and François Blanchard (q.v.). It trades in cattle, grain, leather, and textiles. Pop. 5200.

Andenne, industrial tn in Belgium, 12 m. E. of Namur. Its manufs. include paper, porcelain, and tobacco-pipes (an industry dependent upon a bed of pipe-clay). A. was one of the Belgian tns whose inhab. especially suffered at the hands of the invading Germans in the 1914 invasion. Some 100 civilians were shot and a still larger number deported. Pop. 7700.

Anderab, or **Inderab**, tn of Afghanistan, in a fertile dist. on the Hindu Kush Mts. Pop. 6500.

Anderida, see **PEVENSEY**.

Anderlecht, one of the main suburbs of Brussels, Belgium, SW. of the city itself. The 15th-cent. church of St-Pierre, built over an 11th-cent. crypt, is of great artistic interest. The tn has an important cattle market. Pop. 91,100.

Anderlues, tn in the prov. of Hainaut, Belgium, 7½ m. W. of Charleroi. It has coal-mines. Pop. 13,000.

Andermatt, Swiss vil. in the canton of

Uri. It is a noted tourist and winter sports centre at the junction of the Furka Pass with the St Gotthard road. Elevation 4700 ft.

Andersaoh (anct **Antunnaeum**), Ger. tn in the *Land of Rhineland-Palatinate* (q.v.), on the Rhine (q.v.), 47 m. NW. of Mainz (q.v.). It was once a Rom. camp, but there is evidence that the site has been occupied since prehistoric times. The tn was admitted to the Hanseatic League (q.v.) in 1253. Chemicals and cement are manuf. Pop. 16,000.

Anders, Wladyslaw (1892-), Polish lieutenant-general. He served in the Russian army from 1914 to 1917 and in the Polish Poznan forces in 1918. During the Russo-Polish war of 1919-20 he commanded a cavalry regiment. At the time of the Ger. invasion of Poland in 1939 he was a brigade commander. He was deported by the Russians, but was released in 1941; he subsequently became commander of the Polish II Corps during the It. campaign. He refused to recognise the Lublin Gov. sponsored by the Russians, and since the war has lived in exile. His pubs. include *An Army in Exile: the Story of II Polish Corps*, 1949, and *Hitler's Defeat in Russia*, 1953.

Anderson, Hans Christian (1805-75), Dan. writer, one of the greatest children's story-tellers of the world. He was *b.* at Odense in Fyn, son of a sickly shoemaker, who *d.* in 1816. Thrown on his own resources he built himself a toy theatre, made clothes for his puppets, and read borrowed plays, especially those of Shakespeare and Holberg. It was planned to teach him tailoring, but he wanted to be an opera singer and set out for Copenhagen, where he was taken for a lunatic and rebuffed at the theatres. Befriended by the musician Weyse and the poet Guldberg, he became a dancing pupil at the Royal Theatre where, eventually, he gained the patronage and lifelong friendship of Jonas Collin, the manager. Later King Frederick VI, becoming interested in the strange lad, had him educ. at the grammar school at Slagelse. In 1830 he pub. his first vol. of poems, including the widely trans. *Dying Child*. This was followed by a literary satire called *A Walk to Amak*. Adverse criticism met him, but he eventually triumphed after travelling abroad, again at the king's expense. His works, the best of which are proverbially known as *Hans Andersen's Fairy Tales*, include *Picture-books without Pictures*, *A Poet's Bazaar*, *Tales from Jutland*, *The Wild Swan*, and *The Ice Maiden*. His *Ugly Duckling* and *The Brave Tin Soldier* are known and loved by children the world over; although his stories have a deeper meaning really meant for adults. A's *Fairy Tales* have been trans. into 35 languages. See S. Toksvig, *The Life of Hans Christian Andersen*, 1940; C. B. Burnett, *The Shoemaker's Son*, 1943; Rumer Godden, *Hans Christian Andersen*, 1955; *The Mermaid Man*, an autobiography (trans. M. Michael), 1955.

Anderson, Alexander (1845-1909), poet, *b.* Dumfriesshire, became a surfaceman on

the railway. He spent all his leisure in self-culture, taught himself sev. languages, and eventually rose to be librarian of Edinburgh Univ. His vols. of verse include *Songs of Labour*, 1873, *Two Angels*, 1875, *Songs of the Rail*, 1878, and *Ballads and Sonnets*, 1879.

Anderson, Carl David (1905-), Amer. physicist, *b.* New York. Studied at California Institute of Technology. In 1932 he discovered the positron or positive electron, predicted by Dirac (q.v.), and was awarded the Nobel prize in 1936.

Anderson, Sir Edmund (1530-1605), lawyer, appointed serjeant-at-law to Queen Elizabeth in 1579. He was the author of *Reports of Many Principal Cases Argued and Adjudged in the Time of Queen Elizabeth in the Common Bench*.

Anderson, Elizabeth (Garrett) (1836-1917), physician. She was the pioneer of the movement to include women in the medical profession. After a severe struggle she at last was admitted to the Society of Apothecaries, London. In 1866 she founded St Mary's Dispensary for Women. It later became the New Hospital; she officiated there 20 years. She obtained her degree of M.D. from the univ. of Paris, 1870. In London she took part in public life, working for women's education. She married in 1871 Mr J. G. S. Anderson, a shipowner, who *d.* in 1907. In 1908 she was elected mayor of Aldeburgh, her native tn, being the first woman mayor ever elected in England. See Naomi Mitchison, *Revaluations*, 1931, and E. M. Bell, *Storming the Citadel*, 1933.

Anderson, James (1662-1728), Scottish genealogist and antiquary, *b.* Edinburgh, and educ. at the univ. there. His main work was *An Historical Essay showing that the Crown and Kingdom of Scotland is Imperial and Independent*, 1703, for which he was rewarded by the Scottish Parliament.

Anderson, John (1726-96), natural philosopher, *b.* Dumbartonshire. He founded A. College, Glasgow. In 1756 he became prof. of oriental languages at Glasgow Univ., and 4 years later prof. of natural philosophy. He was interested chiefly in the application of science to industry. He *d.* in Glasgow. Produced *Institutes of Physics*, which went through 5 eds. in 10 years.

Anderson, Mary (1859-1942), Amer. actress of great beauty, *b.* California. Her father was an officer in the Confederate service during the Civil war. He *d.* in 1863. His daughter was educ. at Rom. Catholic institutions till she was 13, when she studied for the stage upon the advice of Charlotte Cushman. Her first appearance was at Louisville, in Kentucky, in the part of Juliet, in which she was a great success. She settled in England and had a most distinguished career on the London stage. In 1889 she retired and married Antonio de Navarro.

Anderson, Maxwell (1888-), Amer. dramatist, *b.* Atlantic, Pennsylvania, son of a clergyman. Educ. at Notre Dame Univ. and Stanford. He worked as a journalist in San Francisco and then in New York. He is counted one of the

greatest Amer. dramatists of his time, his greatest success being with historical plays such as *Elizabeth the Queen*, 1930, *Mary of Scotland*, 1933, *Joan of Lorraine*, 1946, and *Anne of the Thousand Days*, 1948. Both *Your Houses*, 1933, a political satire, was awarded the Pulitzer Prize. Others of his plays are *Saturday's Children*, 1927, *Winterset*, 1936, *High Tor*, 1937, *Key Largo*, 1939, *Journey to Jerusalem*, 1940, *Candle in the Wind*, 1941, *Truckline Café*, 1946, *Barefoot in Athens*, 1952, and *The Bad Seed*, 1955. *The Essence of Tragedy*, 1935, is a study of dramatic theory.

Anderson, Robert (1770-1833), Cumbrian poet, b. Carlisle. His first vol. of poems was pub. in 1798, and was followed in 1801 by the popular ballad *Betty Brown*. His best-known work, the collection of ballads in the Cumbrian dialect, appeared 4 years later. Amongst the best of his dialect poems are 'The Impatient Lass,' 'King Roger,' 'Will and Kate,' 'The Bashful Wooer,' and 'Jenny's Complaint.' His *Poetical Works* (and autobiography) were pub. at Carlisle in 1820.

Anderson, Sir Robert (1841-1918), criminologist and writer, b. Dublin. Educ. Trinity College, in 1868 he was appointed Home Office adviser in matters relating to political crime, and later became assistant commissioner of police of the metropolis. He was head of the Criminal Investigation Dept. from 1888 to 1901. In 1910 he caused a sensation by confessing the authorship of the famous *Times* letters of 1887 entitled 'Parnellism and Crime.' He was well known for his writings in defence of orthodox religion, among which may be mentioned *The Bible and Modern Criticism*, 1902, and *The Bible or the Church?*, 1908. He was also the author of *Criminals and Crime*, 1907, and *The Lighter Side of my Official Life*, 1910. See life by his son, A. P. Moore-Anderson, 1919.

Anderson, Sherwood (1876-1941), Amer. author, b. Camden, Ohio. At 14 he became a house painter, then joined the army and fought in Cuba. His first novel, *Windy McPherson's Son*, 1916, portrayed life in the Middle W. with marked psychological insight. *Winesburg, Ohio*, 1919, a collection of short stories, is often thought his best work. Other novels are *Marching Men*, 1917, *Poor White*, 1920, *Many Marriages*, 1922, and *Dark Laughter*, 1925; books of short stories are *The Triumph of the Egg*, 1921, *Horses and Men*, 1923, and *Death in the Woods*, 1933. *A Story Teller's Story*, 1924, and *Tar, a Midwest Childhood*, 1926, are autobiographical.

Anderson: 1. City, co. seat of Madison co., Indiana, U.S.A., 34 m. N.E. of Indianapolis. It has meat-packing and oil-refining industries, and manufs. tools, automobile parts, pumps, machinery, wire, glass, etc. It is the seat of A. College. Pop. 46,800.

2. Co. seat of A. co., S. Carolina, U.S.A., 28 m. S.W. of Greenville; it has textile mills, foundries, printing, and manufacturing, and produces cotton, fruit, and vegetables. A Junior College is here. Pop. 19,770.

Anderson's College, Glasgow, founded by John A., 1796, and endowed by him

with a library, museum, and philosophical apparatus, later called the College of Science and Arts. In 1886 the non-medical sections were incorporated with other institutions as the Glasgow and W. of Scotland Technical College. In 1912 it was renamed the Royal Technical College, and was affiliated to Glasgow Univ. (q.v.) in 1913.

Andersonville, vil. of Sumter, Georgia, noted as having been the site of a Confederate States military prison, where Union prisoners were confined during the Civil war. This prison was kept in so scandalous a condition that those incarcerated in it d. by thousands. Pop. 300.

Andersson, Karl Johan (1827-87). Swedish explorer, made sev. important expeditions in S. Africa, which he described in *Lake Ngami, or Discoveries in S. Africa*, 1856, *The Okavango River*, 1861, and *Notes of Travel in S. Africa*, 1875.

Andes, great mt system in one long continuous chain lying along the W. coast of S. America. Its length is approximately 5000 m., and it extends from the isthmus of Panama to Cape Horn. Its widest point has a breadth of 100 m. The average height of the chain is approximately 13,000 ft. It is the greatest mt system in the world. A theory that gains in evidence is that the A. are connected with the Rocky Mts of N. America. The whole system may be divided into 2 almost parallel chains separated by a declivity in which lesser mt ranges rise. The E. range is known as the A., but in Peru, Colombia, and Bolivia it is called Cordillera Real de los Andes. In Argentina the E. system merges into the W. div., and both ranges now bear together the name of Cordillera de la Costa. The W. section, in Colombia, Peru, and Bolivia, is called La Cordillera, while below lat. 23° S. it becomes the Cordillera de los Andes. The southernmost extremity is Cape Horn, and here the range extends into the sea and forms is. named Diego Ramirez. The great Chonos Archipelago owes its formation to a similar cause, and many authorities aver that it is the is. that constitute the prin. part of the range. In Patagonia the system is interrupted to some considerable degree by glaciers and deeply cut floods. The highest peaks are Tolima (18,300 ft) in Colombia; Cayambe (19,155 ft), Antisana (19,335 ft), Cotopaxi (19,600 ft), and Chimborazo (20,500 ft) in Ecuador; Huascarán (22,155 ft), Yerupaja (21,602 ft), and Ausangate (21,326 ft) in Peru; Illampu (21,500 ft), Illimani (21,221 ft), and Sahama (21,000 ft) in Bolivia; Llullaillaco (20,243 ft) and Copiapo (19,685 ft) to the S. of Atacama Desert; Aconcagua (23,080 ft), the highest peak in the whole range, in Argentine; Cima de Mercedario (22,210 ft) and Ojos del Salado (c. 23,000 ft) in Chile.

The whole region is volcanic and possesses many active volcanoes, the chief of which is Cotopaxi, in Ecuador, the glow from the crater of Cotopaxi sometimes attaining the extraordinary height of over 3000 ft above the crater. In tracing the world's 'ring' of volcanoes, the A. form a link of special significance owing to the

abundance of volcanic results and present-day activity. In Tierra del Fuego the Cordillera is composed of crystalline schists, the extremity of which portion is Mts Darwin and Sarmiento. The A. abound in plateaux, the most important of which are Assuay (14,500 ft), Colloa (12,500 ft), Cruz Verde (11,695 ft), Pasco (11,000 ft), Quito (9500 ft), and Bogotá (8958 ft). The mineral wealth of the A. is fabulous, the chief metals being gold, silver, platinum, mercury, copper, lead, tin, and iron. The climate in the Andean region is rendered very dry by the effect of the mts in cutting off the rain-bearing winds. From the A. eastwards, however, a heavy and beneficial rainy season owes its fall to the position of the A., as they lie directly across the trade winds. The great watercourses of the Amazon, Orinoco, and Plata owe their birth to the E. terraces of the A. The tremendous scale upon which all phenomena are created in this vast mt system forms one of the chief attractions to visitors. Mt exploration has been the work of expeditions from Germany, France, Italy, and America, but not from England, save those of Whymper to Ecuador in 1880 and Sir Martin Conway to Bolivia in 1898. Whymper climbed 8 peaks, including Chimborazo, and Conway 3, including Illimani. Peru offers splendid mountain-ering on ranges similar to the Himalaya in height, shape, and glaciation. Sov. hundred great peaks there remain unclimbed and these have drawn many expeditions since 1950. The best region for pioneer work is S. Chile and the interior of Tierra del Fuego, both being largely unexplored. See E. Whymper, *Travels Amongst the Great Andes of the Equator*, 1892; E. A. Fitzgerald, *The Highest Andes*, 1899; L. Gallois, *Les Andes de Patagonie*, 1901; Lord Conway, *The Bolivian Andes*, 1902; 'Climbs in the High Andes of Peru', *American Alpine Journal*, 1941; A. Heim, *Wunderland Peru*, 1948; Bennett and Bird, *Andean Culture History*, 1949; H. and S. Kinzl, *Cordillera Blanca*, 1950; B. Pierre, *La Conquête du Salcantay*, 1953; G. and L. N. Kogan, *The Ascent of Alpamayo*, 1954.

Andes, see MANTUA.

Andesite, name given originally to a group of lavas found in the Andes, but now applied to a large number of intermediate igneous rocks found in volcanic areas throughout the world and belonging to all geological epochs. They show considerable differences in composition, but usually consist of a ground-mass of felspar crystals, in which other minerals, such as biotite, hornblende, augite, and hypersthene, often occur. They are common in the Andes and Cordilleras of S., central, and N. America.

Andhra Pradesh, E. coast state of India, bounded by the Bay of Bengal on the E., Madhya Pradesh and Orissa on the N., Bombay and Mysore on the W., and Madras on the S., populated overwhelmingly by the Telugu-speaking Andhras, second largest linguistic group in India. The terrain varies from parched dists. in Telangana in the Deccan highlands to

hilly tracts pierced by riv. valleys in the E. Ghats and fertile delta tracts at the mouths of the Krishna and Godavari rts.

History. A powerful Andhra kingdom covered much of the Deccan in the 2nd and 3rd cents. AD; later various Hindu and Muslim overlords of India held sway here, followed by the Nizams of Hyderabad. In modern times Andhras, like other linguistic groups, have asked for their prov., and in Oct. 1953 the Teluga areas of Madras became a state. In 1956 much of the Nizam's domain, including his cap. at Hyderabad, was added to A. P.

Development. Delta irrigation gave A. P. a crop surplus in the past. Big irrigation projects will improve the yield further, and can be carried out more easily under a single state gov. Thus Nagarjunasagar, to irrigate 2.7 million ac., ceases to be an interstate project. Other schemes will cover 3 million ac. and also improve A. P.'s hydro-electric position. Main crops are rice, millet, maize, tobacco, oilseeds, and cotton. There is not much industrialisation save for Vishakapatnam (Vizagapatam) shipyards and some textile mills. Mineral resources tapped so far are mainly coal at Singareni. An inland riv. and canal transport system is fairly well developed.

Culture. Andhras speak Telugu, a Dravidian language, and have a distinct culture. Andhra Univ. is relatively new, but Hyderabad (Osmania) Univ. pioneered the use of an Indian language (Hindustani) as the medium for univ. teaching.

Government. The Governor acts through ministers responsible to an elected assembly of 301. A. P. has 18 representatives in the Upper and 43 in the Lower House of India's Parliament.

The cap. is Hyderabad (pop. 1,085,000). Other big towns are Vijayawada or Bezawada (161,000), Vishakapatnam (108,000), Guntur (125,000), and Rajahmundry (105,000).

Area 110,250 sq. m.; pop. 32.2 million. See also HYDERABAD (state and city).

Andira, genus of tropical Leguminosae. *A. inermis*, the cabbage-tree, is a species found in the W. Indies; its bark is a strong anthelmintic.

Andizhan: 1. Oblast (prov.) of Uzbek S.S.R. of the Soviet Union. Most of the oblast is under cotton cultivation. There are oil-fields producing petroleum and natural gas. Pop. 630,000.

2. Tn and cap. of A. oblast. It is a junction of railways to Kokand, Namanagan, and Karasu (Kirgiz S.S.R.). It has cotton and food processing plants. Pop. 105,000.

Andkhui, tn in Afghanistan, due N. of Balkh, on the edge of the desert. Its site is extremely unhealthy, and the pop. consists mainly of Turkmen, Uzbeks, and a few Tajiks. Pop. 15,000.

Andocides (440-c. 389 bc), Athenian orator. He was concerned in the mutilation of the Hermæ (415), but turned informer and fled from Athens. After a period of wandering and many adventures, he was recalled in 403 and occupied sev. responsible offices. His failure to negotiate peace with Sparta in 391 led to his

downfall, and he is said to have *d.* in exile. Meanwhile, however, in 399, he was prosecuted for impiety and successfully defended himself in a speech *On the Mysteries*. This is extant; it gives a remarkable account of the Hormae affair. See the ed. by F. Blaas, revised by C. Fuhr (1913). See also R. C. Jebb, *The Attic Orators* (2nd ed.), 1893.

Andorra, small, semi-independent republic, on the Franco-Sp. border, in the E. Pyrenees (q.v.). It is surrounded by mts, and is watered by the R. Valira, which joins the Segre at Urgel (q.v.). A. is said to have been declared a free state by Charlemagne (q.v.). By the *Partage* of 1278 the state was placed under the joint suzerainty of the Comte de Foix (q.v.) and of the Bishop of Urgel (q.v.). The rights of the Comte de Foix passed in time to the Fr. crown, and are now exercised by the President of the Fr. Rep. The co-princes are represented in A. by the 'Viguier de France' and the 'Viguier Episcopal.' The state pays bi-ann. dues of 960 francs to France and 460 pesetas to the bishop. The actual gov. of A. consists of a 'General Council of the Valleys,' which has 24 members (each elected for 4 years); this council elects a president (*Syndic Procureur Général*) and a vice-president, who must not be members of it. The altitude of A. varies from 6500 to 10,000 ft, and its climate is severe. It consists of sev. small valleys and defiles, and has 6 vils.: A.-Vicilla, Canillo, Encamp, La Massana, Ordino, and San Julian de Loria. The inhab. live mainly by pasturage and, in the more sheltered parts, agriculture. The hills are said to have mineral wealth, but this is unexploited. The Andorrans are of Catalan (see CATALONIA) origin, and their language is Catalan (q.v.). They have a reputation for being hospitable, cheerful, and hard-working. By religion they are Rom. Catholic. The cap. of the state is A. la Vieja (pop. 6000). Total area 191 sq. m.; total pop. 5000. See L. G. Leary, *The Hidden Republic*, 1912; V. W. Johnson, *Two Quaint Republics, Andorra and San Marino*, 1913; B. Newman, *Round about Andorra*, 1928; J. Corts Peyret, *Geografía e Historia de Andorra*, 1945.

Andover: 1. Mkt tn of Hants, England, on the R. Ann. a trib. of the Test. The centre of an extensive agric. dist., it owes its importance to its agric. products. It contains many very well-preserved Rom. remains. Its former industries of silk, iron, and parchment are now extinct. Pop. 15,600.

2. Tn of Essex co., Massachusetts, U.S.A., on the SE. side of Merrimac valley, the most important centre in the world for mills. It is noted for the manuf. of woollens and rubber goods, and for its educational institutions, Phillips Academy and Abbot Academy. Harriet Beecher Stowe resided, and is buried, at A. Pop. 12,437.

Andrada e Silva, José Bonifácio de (1763-1838), Brazilian scientist, author, and statesman, and one of the founders of Brazilian independence. Studied in Europe, and subsequently, in virtue of his

distinguished scientific attainments, was appointed prof. of geology and metallurgy at the univ. of Coimbra, Portugal. He returned to Brazil in 1819, took up the cause of independence, and in 1822 became minister of the interior under Dom Pedro I. He was banished in 1823 on account of his democratic opinions, but on the abdication of Dom Pedro was entrusted with the education of the prince imperial. In addition to important scientific memoirs he wrote *Poesias d'America Elysea*, Bordeaux, 1825.

Andrássy, Count Julius (1823-90), Hungarian statesman, b. Kassa, Hungary. In 1847 he was returned as a Radical member of the Diet. He took a prominent part in the Hungarian revolt of 1848, and subsequently went into exile for 9 years. When the Dual Monarchy was estab. (1867) A. was made the first Hungarian premier, and later succeeded Beust as chancellor. Here he advanced radical changes, and under his influence Austria regained something of her former prestige in Europe.

Andrássy, Count Julius (1862-1929), Hungarian statesman, son of the above. In Oct. 1918 he succeeded Burian as foreign minister, being the last foreign minister under the Dual Monarchy. In that capacity he notified Wilson that his gov. was ready to acknowledge 'the rights of the peoples of Austria-Hungary, especially those of the Czechoslovaks and the Yugoslavs,' and to make a separate peace without awaiting the issue between Germany and the Allies. He wrote *Diplomacy and the World War*, 1920.

André, or Andreas, Bernard (fl. 1500), historian and poet, a native of Toulouse, and an Augustinian friar. He is said to have come to England with Henry VII in 1485. He became tutor to Arthur, Prince of Wales. A. wrote in Latin an unfinished hist. of Henry's reign, *Historia Regis Henrici Septimi*, which is of some historical value.

André, John (1751-80), soldier, b. London, was adjutant-general to the Eng. forces during the Amer. war of independence. He was appointed in 1780 to carry on negotiations with the Amer. general Arnold (q.v.), who offered to betray his command at West Point. A., when returning from the interview in civilian clothes, was captured by the Americans and sent to Gen. Washington, who, after a trial, had him hanged at Tappan as a spy. His remains were brought to England in 1821, and a monument is erected to his memory in Westminster Abbey.

Andrea del Sarto (1488-1530), Florentine painter. He was the son of a tailor, hence his surname ('of the tailor'). Pupil of Piero di Cosimo, he also studied the works of Michelangelo and Leonardo da Vinci and the engravings of Dürer. He was known as 'Andrea senza errori' from his faultless drawing. In 1518 he went to France at the inducement of Francis I, but left after a year, having appropriated sums entrusted to him. He painted a number of frescoes for the brotherhood of the

Servites, his 'Madonna del Sacco' being considered his masterpiece. It is said that at the taking of Florence in 1529 the soldiers were so awestruck by his pictures of 'The Last Supper' at S. Salvi that they left the building without committing any violence. He painted portraits as well as religious subjects, and his 'Sculptor' is accounted one of the most popular works in the National Gallery. Among his many pupils were Vasari and Pontormo. He d. of plague. Browning wrote a poem, 'Andrea de Sarto,' in his *Men and Women*.

Andreae, Laurentius (1480-1552), Swedish pioneer of Protestantism, studied at Rome, but returned with Protestant convictions, and as archdeacon of his native place, Ströngnäs, brought Gustavus I over to the side of the reformed religion. The king appointed him to superintend the trans. of the Bible into the vernacular.

Andreas, an O.E. poem, in which are described the adventures of St Andrew in rescuing St Matthew from prison in Mermendon. It has been attributed to Cynewulf. Some of the sea passages, such as the description of the stormy voyage, are particularly fine.

Andrée, Saloman August (1854-97), Swedish engineer and explorer. In July 1897 he attempted to reach the N. Pole by balloon with 2 companions, Strindberg and Fraenkel. This hazardous journey was attempted in the days before the introduction of aircraft, and before the advent of radio-telegraphy. A.'s balloon was one of 5000 cub. metres' capacity, and a start was made from Danskøya, Spitzbergen, on 11 July. A.'s only means of communication with the outer world was by buoys dropped overboard and by carrier-pigeons. Sev. of the former were subsequently found, and a pigeon bearing a dispatch dated 13 July returned home. Thereafter nothing further was known of the intrepid party until the summer of 1930. In that year 2 Norwegian vessels engaged in scientific survey work came upon the bodies of the explorers on Kvitøya, between Spitzbergen and Zemlya Frantsa-Iosia. This discovery was only rendered possible by an exceptional melting of the snow and ice covering A.'s last camp. Among the finds were logs and diaries which showed that the balloon had remained in the air for 3 days and that death had overtaken the party, who had travelled on foot over the ice, or drifted on the floes, in Oct. 1897. The bodies were brought home to Sweden, with the impedimenta of the expedition, and the contents of the diaries and logs pub. According to these the ice fringe was reached on the first day, the drift being at first northerly and NW., then easterly. 82° N. was reached at about midnight of the first day. The balloon then remained stationary for some hours, then moved westerly and then S. The balloon finally landed at 83° 4' N. lat., and was abandoned. The death of the party, after a passage over the ice to a spot many scores of m. to the S., was not due to hunger, for food was found next to the bodies. The

diaries were trans. into English by E. Adams-Ray and pub. 1931.

Andrew, St, brother of St Peter (q.v.) and the first disciple of Jesus. Both brothers were fishermen. St A. preached in Scythia, Thrace, Asia Minor, and in Greece, and tradition tells us that he was crucified at Patras on an X-like cross known as St A.'s Cross. The Russians revere him as having brought them the gospel, and he is the patron saint of Scotland and Greece. The supposed anniversary of his martyrdom, 30 Nov., is honoured as his feast.

Andrew (Arpad), name of 3 Hungarian kings. A. I reigned 1046-61, and was dethroned by his brother. A. II reigned 1205-35, and in 1217 conducted a crusade to Jerusalem; while A. III, last of the Arpad (q.v.) dynasty, came to the throne in 1290, and reigned till 1301, most of his reign being taken up with civil wars.

Andrewes, Lancelot (1555-1626), Anglican bishop, b. London. He was educ. at Pembroke Hall, Cambridge, and in 1589 was made a canon of St Paul's and master of Pembroke Hall. He was chaplain-in-ordinary to Queen Elizabeth I and in favour also with James I. He was made Bishop of Chichester in 1605, and trans. to Ely in 1609, and made a privy councillor. He helped with the preparation of the A.V. of the Bible. In 1618 he was made Bishop of Winchester. One of Milton's early Lat. elegies bewailed the death of A. His best-known work is his *Manual of Private Devotions and Meditations for every Day in the Week*, 1648.

Andrews, Charles McLean (1863-1943), Amer. historian and educator, b. Wethersfield, Connecticut. Educ. at Trinity College, Hartford, and Johns Hopkins Univ. Appointed Farman prof. of Amer. hist. at Yale. A distinguished scholar. A. is known to research workers by his 'Guides' to the materials for Amer. hist. up to the year 1763. The following are among his chief pub.: *River Towns of Connecticut*, 1889; *Contemporary Europe, Asia, and Africa, 1871-1901*, 1902; *The Colonial Period of American History*, 1912; *Fathers of New England and Colonial Folkways in Chronicles of America* series, 1919; and *The Colonial Background of the American Revolution*, 1924.

Andrews, Ellisha Benjamin (1844-1917), Amer. economist and historian. At the Brussels Monetary Conference of 1892, to which he was U.S. delegate, he ardently championed the cause of international bimetallicism. Amongst other works he wrote *An Honest Dollar*, 1889, *History of the Last Quarter Century in the United States*, 1896, revised and enlarged as *The United States in our own Times*, 1903, and *History of the United States*, 1913.

Andrews, Roy Chapman (1884-), b. Beloit, Illinois. Eminent as a zoologist and chief of the div. of Asiatic exploration of the Amer. Museum of Natural Hist. Has discovered oldest known mammals and extensive evidence of primitive human life in the central Asiatic plateau. Discovered many geological strata previously unknown including some of the

richest fossil fields. He was the first to discover fossilised dinosaur eggs, and skull and parts of the skeleton of the baluchitherium, the largest known mammal. Has proved central Asia to be one of the chief centres of the origin and distribution of reptilian and mammalian life. Member of many Amer. scientific societies and corresponding member Zoological Society and Central Asiatic Society of London.

Andrews, Thomas (1813-85), chemist and physicist, was a native of Belfast, where, after practising medicine for some years, in 1845 he became prof. of chem. at Queen's College. His most important scientific achievement was the discovery of the continuity of the liquid and gaseous states. His scientific papers, with a memoir, were ed. by Tait and Crum Brown, 1889.

Andrews, St. see ST ANDREWS.

Andreyev, Leonid Nikolayevich (1871-1919), Russian writer. His stories and plays deal with the phenomena of death, sex, and solitude, with God, evil, and fate, with abnormal conditions and extreme situations. At once impressionistic and symbolistic, they enjoyed great popularity in pre-revolutionary Russia. Politically A. stood close to the revolutionaries in 1905, but was hostile to the 1917 revolution; he d. an exile in Finland. See study by A. S. Kaun, 1924.

Andria, It. tn in Apulia (q.v.), 30 m. WNW. of Bari (q.v.). It has a fine cathedral (partly 11th cent.). Majolica is manuf., and there is a trade in agric. produce and almonds. Pop. (com.) 65,200.

Andrieux, François Guillaume Jean Stanislaus (1759-1833), Fr. poet and dramatist, b. Strasburg. At first he was a lawyer, but forsook that calling for literature. His comedies are distinguished by their wit and charm, among the best being *Les Etourdis*, 1787, and *La Comédienne*, 1816. He also wrote many poems and romances. He was secretary of the Fr. Academy from 1829.

Androclus (often, but inaccurately, **Androcles**), Rom. slave and hero of a story found in the *Noctes Atticæ* (v. 14) of Aulus Gellius. When hiding from his master in the African desert, A. extracted a thorn from the foot of a lion. Recaptured, he was condemned to the beasts; but the lion which confronted him in the arena merely fawned upon him, being the same animal whose pain he had relieved. A. was thereupon set free. See also Aelian, *De Natura Animalium*, vii. 48.

Androgynous (Gk *anēr*, man; *gunē*, woman), biological term synonymous with hermaphrodite. It implies in zoology that the animal, such as a leech, possesses in its one body the organs of both sexes; and in botany that the plant, such as the arum lily, has both male and female flowers on one inflorescence.

Andromache, daughter of Eëtion, King of Thebes in Cilicia, and wife of Hector, one of the finest female characters in the *Iliad*. After the fall of Troy she was given to Pyrrhus (Neoptolemus),

son of Achilles, by whom she had 3 sons; but Pyrrhus afterwards left her to Helenus, the brother of Hector.

Andromeda, daughter of the Ethiopian king Cepheus, and of Cassiopeia. Her mother's boast that her daughter's beauty surpassed that of the Nereids caused Poseidon, their father, to send a terrible sea-monster to invade the kingdom of Cepheus. To appease him A. was delivered to the monster. She was rescued by Perseus, who saw her chained to the rock; he slew the monster and wedded A. She is the subject of one of Corneille's tragedies, and has given her name to a constellation.

Andromeda, constellation situated in a region of the heavens below Cassiopeia. It is to be found by drawing a line through the bright star Beta Cassiopeiae (The Lady in the Chair) and the Pole Star. This passes through a star of the first magnitude in the head of A., marked α and called Alpheretz. Perseus is a neighbouring constellation. A. is a constellation rich in astronomical interest, and includes a remarkable nebula, a triple star, and the radiant point of a meteoric shower. The nebula was first observed through a telescope by Simon Marius on 15 Dec. 1612, who compared it to a candle shining through a horn lantern, but there is evidence that it was discovered by Al Sufi in the 10th cent. The nebula in A. is memorable as the first discovered nebula, its great rival in Orion not being discovered till 40 years later. It is spiral in shape, as shown by a photograph by Dr Roberts in 1888. The Andromedids, a shower of meteorites radiating from a point in A. on 28 Nov. are known to be the fragments of the disrupted, short-period Biela's comet (see **BIELA**). Almaach, or Gamma Andromedae, was found by Herschel to consist of 2 stars of magnitude 2.5 and 5.5, about 10" distant. Subsequent discovery revealed that the fainter of these 2 stars is a pair, green and blue in colour, revolving round the primary orange-coloured or solar star.

Andromeda, genus of plants belonging to the Ericaceae. They are shrubs, natives of Europe, Asia, and N. America. *A. polifolia*, wild rosemary, grows in Brit. peat bogs; *A. rosmarinifolia*, rosemary-leaved marsh A., is found in Newfoundland and Labrador.

Andronicus, see LIVIUS ANDRONICUS.

Andronicus, advocate of the Jews under the reign of Ptolemaeus Philometor against the Samaritans in Egypt, who asserted the authority of the temple on Mt Gerizim against that at Jerusalem. Ptolemaeus Philometor was appealed to; Sabbai (Sabbacus) and Theodosius, the Samaritan advocates, lost their case and were put to death.

Andronicus I (c. 1110-85), Byzantine emperor, grandson of Alexius I. He had Alexius II murdered and seized the throne himself in 1183, but in 1185 he was himself assassinated. He did much to restore the prosperity of the empire, but his severity alienated the nobility and this led to his downfall.

Andronicus Palaeologus, the elder and

the younger, Byzantine emperors. The former reigned from 1282 to 1328 and the younger 1328-41. Both reigns were noted for the wars with the Turks, who, in the latter, conquered all the Asiatic ter. of the empire.

Andronicus Rhodius (c. 58 bc), Rom. philosopher. He is chiefly known through his exposition of the teachings of Aristotle.

Androphagi, race of cannibals, mentioned by Herodotus as inhabiting a region adjacent to Scythia. Later the term is used for cannibals generally.

Andropogon, family Gramineae, genus of grasses of warm temperate or tropical regions. *A. argenteus*, with silvery panicles, 4 ft high, of N. America, and *A. glomeratus*, with dense, feathery panicles, are warm border plants in gardens.

Andros, Sir Edmund (1637-1714). From 1674 to 1681 he was governor of New York, and afterwards of New England. In 1689 the colonists deposed and arrested him and he was sent to England to be tried for attempting to seize the charter of Connecticut, but acquitted and appointed governor of Virginia in 1692. This post he held for 6 years.

Andros, is. of the Grecian Archipelago, situated to the SE. of Euboea. It is 25 m. long, 8 m. broad. Area 148 sq. m. It is mountainous, and the soil is not fertile, but springs are plentiful and fruit trees, vines, onions, and grain are produced. The most important tn is A., or Castro, situated on the E. coast. Pop. of is. 14,700.

Andros Island, one of the W. Bahamas, has a length of 100 m., and varies in breadth from 10 to 45 m. It is low and swampy, but well timbered, and exports timbers, pineapples, and sponges. Area 1600 sq. m.; pop. 6720.

Androscoggin, riv. of New Hampshire and Maine, in U.S.A., which rises in the White Mts and subsequently joins the Kennebec below Augusta after a course of 175 m. It furnishes power at Rumford, Auburn, Lewiston, and Brunswick.

Andújar, Sp. tn in the prov. of Jaén, on the Guadalquivir, S. of the Sierra Morena. It produces *alcarrazas*, porous jars which keep water cool. Pop. 26,000.

Anegada, see VIRGIN ISLANDS.

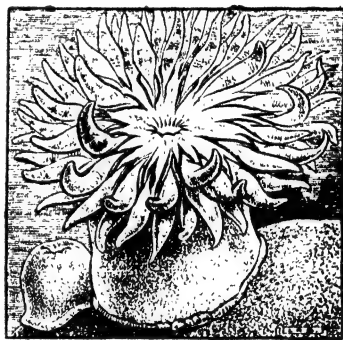
Aneirin, see ANEURIN.

Anelectrotonus. A current can be caused to flow in a nerve by the application of an electromotive force to 2 electrodes attached to the nerve. The part of the nerve near to the anode is found to need a stronger stimulus than under normal conditions to display functional activity. This decreased excitability near the anode is referred to as A. Near the cathode there is a corresponding increase of excitability known as catelectrotonus.

Anemometer, instrument for measuring the speed of the wind. In the Robinson or cup A. 4 hemispherical cups are fixed on 4 arms at right angles so that their concave surfaces are in the same direction of rotation. The motion imparted by the

wind is trans. by a series of cog-wheels so as to indicate m.p.h.

The Dines or pressure-tube A. consists of 2 tubes, one of which has an open mouth kept facing the wind by a vane as in a weathercock. The increased pressure is communicated down the tube to a recording apparatus. The other tube is perforated by small holes arranged in rings so that suction, or a decrease in pressure, is produced by the wind passing across the holes. The decrease in pressure is also communicated to the recording apparatus, which consists of a float in a closed vessel, so arranged that when the wind is blowing the increased pressure in the first tube is applied underneath the float, raising it in the water, and the decreased pressure is communicated to the air above the float, also tending to raise it. The movements of the float are registered graphically on a slowly revolving drum. For very exact and delicate measurements the hot-wire A. is used. This depends on the fact that wind blowing over a wire, maintained at just below red heat by an electric current, changes its resistance by cooling.



SEA ANEMONE, CLOSED AND EXPANDED

Anemone, genus of Ranunculaceae, includes sev. well-known and beautiful flowers which possess the property of extreme acidity. *A. hepatica*, and varieties, *A. narcissiflora*, *A. pavonia*, *A. ranunculoides*, and *A. ricularis* are popular garden flowers. *A. nemorosa* is the wood-A. or 'wind-star,' *A. hepatica*, the hepatica, and *A. coronaria* the common garden A.

Anemone, Sea, name given to the polyps which do not form coral, the Actinaria, of the order Zoantharia, because their spread-out tentacles give them a resemblance to the flower A. They are found attached to rocks and the shells of hermit crabs; they feed on small animal life.

Anemoscope, instrument for determining the direction of the wind. Now usually combined with the pressure-tube anemometer (q.v.).

Anerio, Felice (c. 1560-1614), and **Giovanni Francesco** (probably 1567-1630), It. church composers of the Rom. school, in which they upheld the polyphonic church style of Palestrina. Both also wrote secular music in the new style.

Aneroid, type of barometer in which the pressure of the air is measured without the use of mercury or other liquid. It consists essentially of a hollow box shaped like a bellows in which there is rarefied air. Any external pressure causes a proportionate amount of compression on this box, which is conveyed through a multiplying arrangement to the pointer on the dial. A preliminary graduation in comparison with a good mercury barometer enables the atmospheric pressure to be indicated, or recorded on a drum, as in the standard meteorological barograph. The A. principle is also used in the radio- and radar-sondes to obtain upper air pressures.

Anethum, see PEUCEPANTUM.

Aneurin, or **Aneirin** (fl. c. 600), Welsh poet. Educ. at St Cadoc's College, Llancarvan, he was taken prisoner at the battle of Cattraeth, 603, in which the Saxons defeated the Britons. After being liberated he wrote his epic poem *Gododin*, celebrating the Britons' heroic deeds in the battle. He is said to have been murdered by Eiddyn ab Einyan. See *The Text of the Book of Aneirin*, ed. J. G. Evans, 1908; trans. T. Stephens, 1888.

Aneurysm, or **Aneurism**, circumscribed dilatation of an artery, the wall of the dilatation being the wall of the artery. A.s may be found in any artery but are usually in the thoracic part of the aorta. They are caused by a degenerative condition of the intimal layer of the arterial wall known as atheroma (q.v.), the weakened wall stretching and dilating under the fluid pressure. A.s may attain a considerable size and cause symptoms by pressing on neighbouring structures such as the oesophagus, trachea, bronchi, or spine. *Dissecting A.*, not a true A. because there is no dilatation. It is caused by a haemorrhage into the medial layer of the arterial wall through an atheromatous plaque, the extravasated blood forcing its way between the layers of the intima and splitting them longitudinally. This splitting process may extend from the beginning to the end of the aorta, and even into the iliac arteries, before eventually rupturing externally. *False A.*, a haematoma due to a rupture of an arterial wall—usually traumatic—and having its walls formed by the surrounding tissues. *Mycotic A.*, caused by an infected embolus (see EMBOLISM) settling on the wall of an artery and weakening it through inflammation. *Arterio-venous A.*, a direct connection between an artery and an adjacent vein, usually caused by trauma.

Antfossi, Pasquale (1727-97), It. opera composer, b. Taggia, near San Remo, studied at Naples, visited London in 1783-6 and then settled in Rome as chapel master at St John Lateran. He wrote some church music, 12 oratorios, and over 70 operas, the libretto of one of

which, *La finta giardiniera* of 1774, was also set by Mozart the following year.

Angara, right affluent of R. Yenisey in Siberia, flowing through Lake Baykal. Its length is 1300 m. Large hydro-electric stations are under construction near Irkutsk and Bratsk.

Angary, Right of, in international law, formerly a right claimed by a belligerent, deficient in vessels, to lay an embargo on and seize neutral merchant vessels in their harbours and to compel them and their crews to transport troops and supplies on payment of advance freight. The modern right consists in the right of belligerents to use, or destroy in case of necessity, for the purpose of offence and defence, neutral property on their own or on enemy ter. or on the open sea. See also NEUTRALITY.

Angel (Gk *angelos*, messenger, trans. of the Heb. *mal'akh*), in both the O.T. and N.T., means a spiritual being awaiting God's commands, a messenger, and a means of manifestation of God to man. In the early historical books of the Bible the A. is a manifestation of God Himself. Sometimes it has no form—only a voice, as when the A. of God spoke unto Jacob in a dream (Gen. xxxi. 11); and sometimes there is a form as of a man (e.g. Gen. xviii, xix, xxxii. 24 ff.). Later on the A. is a messenger carrying out the commands of the Lord, as in Ex. xxiii. 20-3 and 2 Sam. xxiv. 16.

A.s are given many other names in the O.T.: 'sons of God' (Gen. vi. 2), 'sons of the mighty' (Ps. lxxxix. 6), 'saints' (Zech. xiv. 5), 'Holy Ones' and 'Watchers' (Dan. iv. 13). They are described as warriors in Joshua v. 13 and Ps. lxxviii. 17, and in the expression 'Lord of Hosts'. Different ranks or degrees exist among them according to Gen. iii. 24, Ps. lxxx. 1, and Ezek. x. 2, which name *Cherubim*; Isa. vi. 2, which names *Seraphim*; and Dan. and Tobit which name 7 Archangels (q.v.), and in particular Michael, Gabriel, and Raphael. In pseudographical books yet more angelic names and classes appear. (For evil or fallen A.s, see under DEVIL.) In the N.T. the Archangels Gabriel and Michael appear again (Luke i, Rev. xii); Jesus mentions the *Guardian A.s* (Luke xv. 7, 10); and from Eph. i. 21 and Col. i. 16 we learn of the existence of *Thrones*, *Dominions*, *Principalities*, *Powers*, and *Mights* (or *Virtues*). Pseudo-Dionysius in his 5th cent. work, *De Hierarchia Celesti*, systematised the evidence as indicating that there were 9 choirs of A.s. According to Heb. ii and 1 Cor. vi. 3, Christians have by the Incarnation been exalted to a higher status than A.s. In Col. ii. 18 the giving of divine worship to A.s is strictly forbidden.

A.s are pure spirits, or intelligences. The attribution of wings to them (as in Isa. vi) is entirely symbolic, and intended to represent their superior heavenly origin, and their swiftness to do the will of God. St Thomas Aquinas, who taught that the individuating principle in creation is matter, declared accordingly that each A. is distinguished specifically

from every other, i.e. each is of a different species (see his *Summa Theol.* 1, 1, q. 50-62). See also J. Hastings, *Dictionary of Christ and the Gospels*, 1906, and A. Edersheim, *Life and Times of Jesus the Messiah*, 1908.

Angel, originally a gold coin of France, where it was first coined in 1340. It was introduced into England by Edward IV in 1465, when it was valued at 6s. 8d., and, being of the same value as the noble, was sometimes called the A.-noble. Under Henry VIII its value was raised to 8s. and under Mary to 10s., and it was last coined by Charles I. The device on the obverse of the coin was St Michael piercing the dragon with a spear, and on the reverse it had a ship, with a large cross for a mast, and the royal arms in front. It was the coin used for 'touching' for the King's Evil (q.v.).

Angel-fish, or **Monk-fish** (*Squatina*), shark much resembling the ray. The species of the family Squatinidae are found in the more temperate seas, where they live on the bottom waiting for the fishes which are their food.

Angelica, family Umbelliferae, genus of herbs of which *A. archangelica*, native to Europe, is chiefly grown, its roots being candied as a sweetmeat; at one time of medicinal and flavouring uses.

Angelico, Fra (1387-1455), Florentine painter who was also a Dominican friar. His full title was 'Il Beato Fra Giovanni Angelico da Fiesole,' or in English 'The Blessed Brother John the Angelic of Fiesole.' He was b. at Vicchio. He is famous for his frescoes, which are in Rome, Florence, Fiesole, and other It. towns, the most wonderful being the series at San Marco, Florence. See *Klassiker der Kunst Fra Angelico*, 1924.

Angélique, see ARNAULD, ANGÉLIQUE, and JANSENISM.

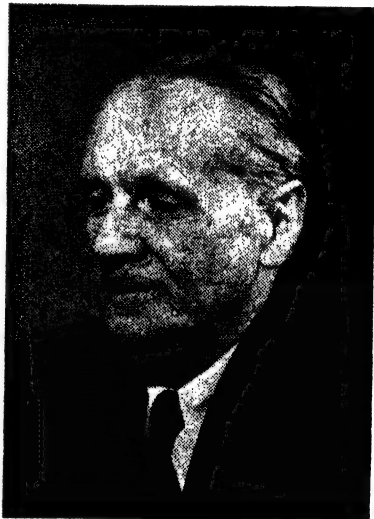
Angell, George Thorndike (1823-1909), Amer. philanthropist, b. Southbridge, Massachusetts, U.S.A. Admitted to the Boston Bar in 1851. In 1868 became founding president of the Massachusetts Society for the Prevention of Cruelty to Animals. Became ed. of *Our Dumb Friends*. Initiated the movement for the estab. of the Bands of Mercy. In 1889 founded and became president of the Amer. Humane Education Society.

Angell, James Burrill (1829-1916), Amer. educationist, b. Rhode Island. Educ. at Brown Univ. Was prof. of modern languages and then took up journalism. Subsequently became president of the univ. of Michigan, which institution he brought to a high state of efficiency. Later became Amer. minister to China and then to Turkey. Pub. *Progress in International Law*, 1875, *Reminiscences*, 1912, and *Selected Addresses*, 1912.

Angell, James Rowland (1869-1949), Amer. psychologist and educationist, b. Burlington, Vermont, son of James Burrill A. (q.v.). From 1894 to 1919 he was in the dept. of psychology at the univ. of Chicago, from 1905 to 1919 as head of the dept. President of Yale Univ., 1921-37. Works: *Psychology*, 1904 (new ed. 1908);

Chapters from Modern Psychology, 1911; *American Education*, 1937.

Angell, Sir Norman (1874-), journalist and economist, son of Thomas Angell Lane of Holbeach. Educ. privately and in France. His early years were spent in ranching in the U.S.A. and, later, in journalism. In Paris he ed. *Galvani's Messenger* from 1899 to 1903 then joined the staff of the *Éclair* and, from 1905 to 1914, was general manager of the Paris ed. of the *Daily Mail*. Dropping the name of Lane, he became



SIR NORMAN ANGELL.

world famous as the author of *The Great Illusion*, 1910, the theme of which is that war is unprofitable to victors. Labour M.P. for N. Bradford in 1929; he was knighted in 1931 and received the Nobel peace prize, 1933. His works include *The Story of Money*, 1930, *The Unseen Assassins*, 1932, *The Money Mystery*, 1936, *For What do we Fight?*, 1939, *Let the People Know*, 1943, *The Sleep Places*, 1947, and the autobiography, *After All*, 1951.

Angeln, dist. in Germany, in N. Schleswig-Holstein (q.v.), said to be the original country of the Angles (q.v.).

Angelot, gold coin, struck in France by Henry VI of England; also a Fr. gold coin first struck in 1310; also a musical instrument like a lute.

Angels of the Elements, see ELEMENTAL SPIRITS.

Angelus, bell rung 3 times a day, at dawn, noon, and sunset, to mark the time of a prayer in memory of the Incarnation. It was instituted in 1326. Its name is derived from A. Domini, the

angelic salutation to the Virgin Mary with which the prayers begin.

Angelus a Sancto Francisco, assumed name of the Franciscan friar, Richard Mason (1601-78), author of *Regula et Testamentum S. Francisci*, 1643, *Apologia pro Scoto Anglo*, 1656, and other rare works.

Angelus Silesius (1624-77), Ger. poet and philosopher, b. Breslau. His proper name was Johann Scheffler. He first practised medicine, but in 1653 joined the Rom. Catholic Church, though his parentage was Protestant. He wrote books on mysticism and also many hymns, which are still used by Protestants in Germany. His main works are *Geistreiche Sinn- und Schlussreime*, 1657, *Cherubinischer Wandersmann*, 1674, and pastoral poems called *Heilige Seelenlust*, 1657.

Angermanland, dist. in Sweden under the gov. of Västernorrland. It is a wild and picturesque country, and well cultivated. Its riv., the Angerman, is over 200 m. in length, and joins the Gulf of Bothnia at the prin. tn of Hernösand. The riv. is navigable near its mouth.

Angermünde, Ger. tn in the dist. of Frankfurt-on-Oder, 53 m. NNW. of Frankfurt (q.v.). It is a mkt. tn and has an iron industry. Pop. 11,000.

Angers, Sir Auguste Réal (1838-1919). Canadian statesman, b. Quebec, of which he was premier in 1876-9. He resigned from the Supreme Court (1887) to become lieutenant-governor of Quebec. In 1892 he joined the dominion cabinet, but resigned in 1895 over the issue of separate Rom. Catholic schools in Manitoba.

Angers, old cap. of Anjou in France, now in the dept. of Maine-et-Loire. Its old name was Andecavi. It is the see of a bishop, has a large theological college and a fine library. The castle, now used as a prison, and the cathedral were both built in the 13th cent. The R. Maine is navigable at this point, and the dist. has extensive industries in wool, cotton, and metal. It is also an agric. centre, and there are slate quarries near by. Pop. 94,400.

Angerstein Gallery, see NATIONAL GALLERY, THE. The A. collection of 38 pictures was purchased by the nation in 1824.

Angevin Line of Eng. kings began with Henry II (1154), who was son of the Count of Anjou (whence the name), and ended strictly with Richard III (1485). John is sometimes described as the last of the A. dynasty because he was the last Eng. king to reign over Anjou.

Angilbert, St (c. 740-814), friend and counsellor of Charlemagne, whose daughter, Bertha, he married. He later became a monk. He was a distinguished poet and was described by Charlemagne as the Homer of the age.

Angina, any disease associated with a sense of suffocating or choking, thus *angina pectoris* (q.v.). The name is also attached to inflammatory conditions of the throat and to a certain kind of septic ulceration of the mouth and fauces known as Vincent's angina.

Angina Pectoris, paroxysmal pain accompanied by a sense of intense oppression about the heart. It is occasioned by a partial blockage of the coronary arteries which supply the heart muscles, and usually occurs in men over 40. The immediate cause of the attack is exertion or emotion; there is a sudden pain affecting the whole chest, then radiating through the left shoulder and penetrating sometimes right down to the fingers. Accompanying the pain is a sense of impending death, the respiration is shallow or arrested, and the patient's anxiety becomes extreme. The attack may suddenly cease, and, although there is temporary weakness, there may be no other signs of the disease until another attack. The number and frequency of attacks vary; there may be only one or two, there may be a chronic form in which the attacks grow in intensity, or a number of severe attacks may end with complete recovery. Usually the outlook is very grave.

Angiolieri, Cecco (c. 1260-c. 1312), lt. poet, the first master of lt. humorous and realistic verse. In his poems he shows himself as an undoubted *bon viveur*, with a marked predilection for wine and women. About 120 of his sonnets are still extant.

Angioma, vascular tumour caused by the enlargement or new formation of blood-vessels. There are sev. varieties.

Angiosperms (Gk *ageion*, vessel; *sperma*, seed), plants with their seeds enclosed in a pericarp, as opposed to Gymnosperms in which the seeds are not so enclosed; the 2 classes making up the Phanerogams or Spermatophyta (q.v.).

The A. are divided into 2 classes, the Dicotyledons and Monocotyledons (q.v.); in the former are such flowers as buttercups, primroses, and nettles, in the latter arum lilies, grasses, and daffodils. These flowering plants do not necessarily have bright petals or sepals, but it is essential that they should have carpels and stamens; reproduction, however, may take place also by budding, apogamy, or parthenogenesis.

Angkor, ant. cap. of the Khmer kingdom of Tchen-la and site of some of the most remarkable examples of massive religious architecture in the world. A. stands in the modern Cambodian prov. of Siem-Reap. The numerous stone monuments of A., built during the 9th-12th cents., spread over an area of nearly 20 sq. m., the largest being A.-Vat and the Bayon. The wealth of rich decoration and statuary of these monuments, which have been partially restored by Fr. archaeologists, is unparalleled. The style is Indian, but is modified by a strong Khmer influence. A. was abandoned by the Khmers in the 15th cent. and was swallowed up by the surrounding jungle. Its subsequent rediscovery in the 19th cent., incorrectly ascribed to Henri Mouhot, has given rise to numerous tales of lost jungle cities. See G. Coedès, *Pour mieux comprendre Angkor*, 1943.

Angle, inclination of one line to another, which meets it, but is not in the same

straight line. This is Euclid's definition of a plane *A.* If the lines are straight the *A.* is *rectilinear*, if curved the *A.* is *spherical* or *curvilinear*. A curvilinear *A.* is measured by the *A.* between the tangents to the curves at the meeting point. *A.s* are usually measured in degrees, one degree being 1/360th of a complete revolution. In circular measure the unit is a *radian*, which is an *A.* at the centre of a circle opposite an arc equal in length to the radius; there are 3.14159... radians in 180°. A *solid A.* is the space contained by 3 or more planes meeting at a point. A *dihedral A.* is an *A.* between 2 planes, a *trihedral A.* one between 3 planes. *A.s of incidence, reflection, and refraction* are, in physics, the *A.s* formed by the direction of a wave with the normal to the surface at the point of incidence, reflection, or refraction. The *critical or limiting A.*, in light, is the *A.* at which a ray of light strikes the surface between 2 media so that the refracted ray passes along the surface. The *critical A.*, in friction, is the *A.* at which the component of the weight directed down the slope of the inclined plane balances the friction. The *A. of capillarity* is the *A.* formed, owing to surface tension, when a liquid is placed in contact with a solid.

Anglebert, Jean Henri d' (1635-91), Fr. organist and composer, b. Paris. He was one of the important masters of harpsichord music of the Fr. school. His pieces include many arrangements of airs and dances from Lully's operas, and he also wrote organ music as well as a treatise, *Principes d'accompagnement*.

Anglers are any fish of the order *Peculiati* of the Teleostei. The *Lophius piscatorius*, known also as monk-fish, sea-devil, frog-fish, or goose-fish, angles for its prey in a peculiar fashion. The 3 anterior spines of the dorsal fin are transformed into tentacles, the foremost of which ends in a bright, worm-like tip which acts as bait and can grow again readily. The angler swims badly and lurks near the coast; it attains a length of 3 to 5 ft, and is found in Europe and America. The deep-sea angler fishes (*Ceratoides*) have an angling rod tipped with a luminous lure.

Angles, or Angli, Ger. tribe who occupied the dist. of Schleswig-Holstein known as Angeln. They invaded Britain in the 5th cent., and settled in E. Anglia, Mercia, and Northumbria. From them the name England is derived (Angleland).

Anglesey, Henry William Paget, 1st Marquess of (1768-1854), soldier and statesman, a son of the Earl of Uxbridge, educ. at Westminster and Christ Church, Oxford. He entered the army and served with great distinction in Flanders and the Peninsula. He was created Marquess of A. for his bravery at the battle of Waterloo, where he lost a leg. He was appointed Lord-Lieutenant of Ireland in 1828, but was recalled by Wellington for supporting Catholic emancipation, though he was later reappointed by Grey (1830) and was afterwards responsible for the Irish Board of Education (until 1833).

Anglesey, is. off the N. Wales coast, and divided from the mainland by the Menai Straits. It is 21 m. long by 19 broad. It forms a co. and sends a member to Parliament. Lead, copper, and zinc are among the minerals found on the is., and sheep- and cattle-breeding are carried on. It is joined to the mainland by a fine suspension bridge and also by the Britannia tubular bridge. Holyhead is on an adjoining is., and is the starting place of the route to Ireland; Llangefni is the administrative centre, and other tns are Beaumaris (co. tn) and Amlwch. Pop. 52,000.

Anglia, East, kingdom founded c. 500 AD, which consisted of roughly the modern Norfolk, Suffolk, Cambs, and the Isle of Ely, and formed one of the kingdoms of the A.-S. Heptarchy. It was from time to time forced to acknowledge Mercian supremacy, and submitted to Egbert of Wessex in 826. Soon after it was invaded by the Danes, who held it until forced to submit to Edward the Elder, 918. Under Canute it was one of the 4 great earldoms, the other 3 being Northumbria, Mercia, and Wessex.

Anglican, see ENGLAND, CHURCH OF.
Anglican Communion, see ANGLICANISM.

Anglicanism, the body of doctrines and observances of the Church of England (q.v.) and of those Churches throughout the world in communion with it. This fellowship of Churches is known as the Anglican Communion. Its growth is largely due to the expansion of the Brit. Empire, and to the missionary enterprise of the 19th cent. What were originally chaplaincies in the colonies or missionary outposts have now been organised into the diocesan and prov. system, and the Anglican Communion now comprises about 350 dioceses. Its member churches are the Church of England, the Church in Wales, the Church of Ireland, and the Episcopal Church in Scotland; the Protestant Episcopal Church of the U.S.A., whose first bishop was Samuel Seabury, consecrated in Aberdeen, Scotland, in 1784 after the Amer. War of Independence, the Amer. Church hitherto having been within the jurisdiction of the Bishop of London; the Anglican Church of Canada (first bishop, Charles Inglis of Nova Scotia, 1787); the Church of England in Australia (first bishop, Wm Broughton, 1836); the Church of the Prov. of New Zealand (first bishop, George Augustus Selwyn, 1841); the Church of the Prov. of S. Africa (first bishop, R. Gray, 1847); the Church of India, Pakistan, Burma, and Ceylon (first bishop, T. F. Middleton, 1814); the Church of the Prov. of the W. Indies (first bishops, C. Lipscomb of Jamaica and W. H. Coleridge of Barbados, 1824); the Church of the Prov. of W. Africa, inaugurated in 1951; the Church of the Prov. of Central Africa, inaugurated in 1955; the Church in China (Chung Hua Sheng Kung Hui); the Church in Japan (Nippon Sei Ko Kwa). There are also 19 scattered dioceses, not yet integrated into any prov., whose bishops are under the

metropolitcal jurisdiction of the Archbishop of Canterbury. See also LAMBETH CONFERENCES.

Angling, art of catching fish with a line and hook which is baited with worms, flies, or small fish. The antiquity of this pastime is proved by mention of it in the works of Gk and Lat. writers, while allusions to it appear in the O.T., and the pursuit of A. is known to have been practised in ant Egypt. Much has been written about it, and the oldest work printed in English on the subject was issued in 1496 by Wynkyn de Worde, in a later ed. of a work on hunting and hawking, *The Book of St Albans*, which appeared in 1486. To a woman may belong the honour of being first to write on the piscatorial art, for the work is ascribed to a nun, the prioress of a nunnery in Herts, Dame Juliana Berners.

The most famous work on the subject, however, is that of Izaak Walton, a linen draper of Fleet Street, whose book, *The Compleat Angler or the Contemplative Man's Recreation*, is world renowned. The first ed. appeared in 1653, and it passed through 5 eds. during the author's life, the last being in 1676. With the later eds. a treatise was added by Walton's friend, Charles Cotton, containing instructions how to angle for a trout or grayling in a clear stream. This essay is still usually printed with the work.

The Compleat Angler is in truth more than a work on fishing, for the author depicted the delights of the countryside with great delicacy and charm, and the unaffected humour of the dialogue and its purity of style all add to the high reputation of the book. Since Walton's day the output of books upon the subject has been very prolific. Some of the prin. are mentioned at the end of this article. In this article we shall deal chiefly with fresh-water fishing.

The chief appliances needed by anglers are the rod, line, and hook. The first is made of various materials. Cane rods are the most common and perhaps the most serviceable in use to-day. Split cane is favoured for trout and salmon rods, because of its ability to stand up to the stresses and strains of continual casting. Bottom rods of quality are often made of Sp. reed, whole cane and split cane. Greenheart rods and rods of lancewood and hickory are still used, but greenheart rods of first quality are hard to come by. Perhaps the greatest step forward in the search for more durable rod materials lies in the development of glass fibre, which makes excellent fly rods when constructed as hollow-glass fibre rods and powerful and light spinning rods when made from solid glass fibre. As a material fibre glass is competing with split cane, and even sea rods are now made of fibre glass. The reel is another piece of A. equipment much improved in the past twenty years. A variety of salt- and fresh-water fishing-reels are now in use, and these, because of development and engineering skill, enable anglers to master heavy fish. As a direct result of the fixed spool reel, with

its slipping clutch mechanism, it is possible for an angler to land a 15- or 20-lb. fish on a line of 4 or 5 lb. breaking strain. The multiplier reel, with a 4 to 1 geared line recovery, precludes the entanglement of the angler's line and simplifies the handling of fighting fish.

Lines too have been greatly improved since the day of silkworm gut, although for trout and salmon fly-fishing water-proofed silk remains the best material. For spinning and bottom fishing nylon has taken the place of gut, as it has for the fly-fisherman's cast. Gut of the finest quality was imported from Japan, but it was expensive, deteriorated, and required steeping before use. Monofilament nylon and braided nylon are now the first choice for spinning lines, and most bottom fishing is done with nylon lines, which are comparatively cheap and can be obtained in a wide range of breaking strains and diameters suitable for fine fishing for roach or dace or handling fish of 30 or 40 lb. in weight.

For bottom fishing the entire line may be of one breaking strain, although a terminal length of finer line is used on occasion, and to this is attached the hook and shot used to weight the line and keep the bait fishing at the required depth. A variety of floats are used, from fine quills used in roach-fishing to large cork floats essential for supporting a line when live bait is being offered for pike. In other forms of coarse fishing no float at all is employed, the line being floated on the water when a crust is used to lure such fish as carp which are fond of bread cubes. The angler must, of course, choose his bait with reference to his fish. Artificial flies are of 2 varieties, the dry fly and the wet fly. The former is used for cocking on the water and the latter for sinking beneath the water. The dry fly floats on account of its extra dressing. Dry fishing is done with single flies, while 2 or 3 wet flies are used at one time. Wet flies are used in strong running streams.

The finest fresh-water fish in this country is undoubtedly the trout and it affords the best sport to anglers. Trout abound in most of our lakes and rivers, and are usually angled for with an artificial fly. They are voracious, and by their agility and cunning frequently succeed in making their escape. A good landing-net is necessary for this fish. The trout usually spawns in Oct. and Nov., sometimes earlier or later, according to the season.

There is no great measure of agreement on the choice of rods for fly-fishing. Indeed, as has been well said, 'one of the charms of angling is that it presents an endless field for argument, speculation, and experiment' (T. E. Pritt). But for loch fishing anglers at least seem to agree that nothing is to be gained by laying down a hard and fast rule, because so much depends on the characteristics of the individual. Progress in rod-building has been rapid in the last cent., and 'with the advent of the built cane or split bamboo rod, we have an

article which combines lightness with strength to an extent which no wooden rod can equal' (R. A. Chrystal). In salmon-fishing the very long rods of 18-20 ft, once considered essential, have almost disappeared, as the same work can be done by a cane rod of 15 ft, as far as length of cast is concerned—though the long rod enabled the angler to hang the fly over fish lying well out in a riv. In loch fishing the conditions are different and trout rods in general have undergone a shortening, so that on a loch a rod of 14 ft is about the longest in use. Those who still use rods of 14 ft for loch fishing mostly use wooden rods. In choosing a line for loch fishing the almost universal practice is to have it short and to splice on enough backing almost to fill the reel. Most reels for trout rods are big enough to take 30 yds of line and 40 to 50 yds of thin silk backing, and this is ample to deal with most heavy fish. A level line, which is as heavy as the rod, will cast properly, and is most generally useful, as a very light one flaps in the wind too much and causes loss of touch with the flies. Greasing is of doubtful value; it keeps some lines in good order, but others become soft and sticky and are useless long before they are worn out. For worm fishing for trout the rod should be fairly stiff; one cannot throw a bait accurately with a supple one. Perhaps the best rod is one about 12 ft. For fly-fishing for brown trout on rivers the rod should be of greenheart, split cane, or hollow glass, not too supple in the middle, while the point should be fairly flexible—for with a rod supple in the middle the angler cannot cast into a wind coming from his front, and not well with a wind blowing from either side; and a stiff top piece does not yield when a fish splutters, and thus the hook is liable to be torn from the fish's mouth. Present-day ideas favour very short and very light rods; but some anglers are strongly opposed to both and think that the length and weight of the rod must depend on the breadth of the riv. The reel should be too stiff rather than slack, and those made with a brake which can be regulated are often preferred.

The salmon is one of the angler's most coveted prizes and affords excellent sport. It is partly a fresh-water and partly a salt-water fish, though its spawn is generally deposited in the former. The spawning season is from the end of autumn until the beginning of spring. The length of rod for this fish is usually from 13 to 15 ft. The Scottish rivers are famous for their salmon. *See further under SALMON.*

Roach are generally caught with maggots or paste placed on the bottom of ponds or streams, or with brandling worms. The perch is a bold-biting fish, and the best bait is a worm. The pike, or jack, as the young ones are called, is perhaps the greediest of fish, and spawns about Mar. in very shallow water. The finest specimens are those found in clear rivers. The best bait is a small fish.

The barbel is a fighter fish when found

in weir pools and it is a good plan to use ground bait, sometimes put in overnight. Bream are generally reckoned as pond fish (golden bream are common in the Norfolk Broads), although they are sometimes met with in slow-running streams. In fishing for these the angler should take care to keep concealed from the fish and let his bait sink near the bottom among the weeds. Carp and tench are also pond fish and thrive best in mud, but never well in cold bare water; both are also found in sluggish rivers. Tench are noted for frequenting the foulest and muddiest portions of the pond. The fisherman must angle for these very near the bottom and allow the fish plenty of time to gorge the bait, or fish on the surface, sitting well back from the bank and presenting his bait in a previously cleared patch in the weeds. They are in season from Sept. until the end of May. Grayling are remarkably timid fish, and must be angled for with very fine tackle, and when hooked the angler must be careful to work the catch carefully as the hold gives way easily in the mouth. They will return to the bait, however, as a rule. The chub will rise easily at a natural or an artificial fly, and at spawning time will take most bait, such as worms, etc. It usually requires the aid of a landing-net.

Dace are very active and cautious, but will nearly always rise to the fly of a skilful angler. They frequent gravelly and sandy bottoms and deep, weed-shaded holes. In sultry weather they are often caught in shallows with gentles or grasshoppers. Bream and bream kneaded into small round cakes is a very good ground bait for these fish, but it must always be thrown upstream. The gudgeon is allured with almost any kind of bait. It spawns 2 or 3 times a year, and frequents gentle streams with gravelly bottoms. In A. for gudgeon a good plan is to stir up the bottom previously, which rouses the fish from a state of inaction and causes them to collect in shoals. A float is always used, but time should be allowed for the fish to nibble at the bait, as they will do this for some time before swallowing it. The loach can best be caught with a small red worm, while minnows are of little use for sport, but make excellent bait for pike, trout, salmon, and other fish. Close seasons are observed for most fish according to their natures and haunts.

For further details of all the fish mentioned here the reader is referred to the articles under their various headings, where their natures, habits, and haunts are dealt with more fully. Those we have mentioned here are, of course, those taken by anglers in Great Britain. The Anglers' Association is the chief body in this country which looks after the interests of this sport.

Bibliography: Viscount Grey, *Fly Fishing*, 1899; W. E. Hodgson, *Trout Fishing*, 1904, *Salmon Fishing*, 1906; J. Bickerdyke, *Angling in Salt Water*, 1921, *Angling for Pike and The Book of the All-Round Angler*, 1922, *Angling for Coarse Fish*, 1923; F. M. Halford, *Modern Development*

of *Dry Fly*, 1923; J. T. Jenkins, *The Fishes of the British Isles*, 1925; H. A. Chrystal, *Angling Theories and Methods*, 1927; W. Keith Rollo, *The Art of Fly Fishing*, 1931; Herbert Palmer, *The Roving Angler*, 1933; Sidney Spencer, *The Art of Lake Fishing with Sunk Fly*, 1934; Eric Taverner and John Moore, *The Angler's Week-End Book*, 1935; R. M. Robertson, *Angling in Wildest Scotland*, 1939; E. Taverner, *Fly Fishing for Trout*, 1939, and *Fly Fishing for Salmon*, 1942.

Anglo-Catholics are, as their name indicates, those in the Church of England who, regarding it as part of the Universal or Catholic Church, maintain that at the Reformation none of the essential marks of catholicity was lost. This section, therefore, tends to resent the term Protestant and to stress the term Catholic. The more popular name for this party is the 'High Church' party (q.v.). Anglo-Catholicism is undoubtedly a growing power in the Church of England, and the increase in its influence can be ascribed, in part, to the zeal of its adherents and the intellectual eminence of its protagonists. A.-C. are organised in the Church Union (q.v.) and their most influential organ is the *Church Times*. From time to time Anglo-Catholic congresses are held in London, which afford evidences of an emotional fervour that has been compared to that roused by Wesley, the founder of Methodism. A.-C. display a desire for recognition by the Rom. Catholic Church and are concerned to secure that schemes for reunion between the Church of England and other bodies shall not jeopardise eventual reunion with Rome. The claim to papal infallibility is denied by all but a few, some of whom have introduced into churches the whole of the Rom. ceremonial and teach Rom. dogmas. Others are content, relying on the ornaments rubric in the Prayer Book, to use a ceremonial which has its roots in Rom. Catholic practice. But A.-C. are frequently eclectic in these matters. In general they hold a high doctrine of the church as a divinely founded society and as guardian of the sacraments. They are the successors of the Oxford Movement (q.v.), while extreme A.-C. are the successors of the Ritualists (q.v.). See C. B. Moss, *The Christian Faith*, 1943, and V. Johnstone, *Anglican Way*, 1948.

Anglo-Egyptian Sudan, see **SUDAN**.

Anglo-Israelite Theory, see **BRITISH ISRAELITES**.

Anglo-Japanese Treaty. By the terms of the treaty signed in 1902, Great Britain and Japan undertook to support each other in maintaining the independence and territorial integrity of China and Korea. In 1905 this agreement was amplified by an offensive and defensive alliance, applying to E. Asia and India. The agreement gave a free hand to Japan in the protection of her interests in Korea, and similar freedom to Great Britain on the Indian frontier. It also affirmed the principle of equal opportunities for the commerce and industry of all nations in China. In any hostilities

caused by aggressive action directed against the interests specified, the 2 countries agreed to wage war and make peace together. This agreement was renewed in the form of a new treaty, on 13 July 1911, for a period of 10 years. The alliance was formally dissolved in 1921 through the operation of the agreement reached at the Washington Conference on disarmament (1921-2).

Anglomania, term used for the imitation amongst the French, Germans, or other foreigners of Eng. manners and customs, or an admiration of anything English. In the 18th cent. Eng. literature was greatly admired in Germany, and numerous Eng. books were trans. into German. In France, just before the outbreak of the Fr. Revolution, there was a decided admiration of the free institutions of England. On the other hand, Anglophobia is a horror or fear of anything English.

Anglo-Saxon Chronicle, series of chronological records written in English at various centres, including Winchester, Canterbury, and Peterborough, from the 9th cent. to the middle of the 12th. It contains some picturesque passages and poems, and is the oldest and most complete set of annals in any European vernacular. The earlier part may have been written by King Alfred or under his guidance. See trans. by G. N. Garmonsway, 1953, and parallel ed. of 2 MSS. by C. Plummer, 1892-9.

Anglo-Saxon Language. The terms Saxon and A.-S. are popularly used to designate the form of language introduced into England by Germanic tribes who invaded this country from the 5th cent. onwards. The chief of these tribes were the Saxons, the Angles, and the Jutes. All these tribes spoke closely allied dialects of the Anglo-Frisian group of the W.-Germanic branch of the Indo-European family of languages (see **INDO-EUROPEAN**). The general term of the invaders for the whole country which became their new homeland was *Englaland*, 'Land of the Angles,' and the language was called *Englisc*. Redused the expression *Angli sive Saxon*es, implying that both terms meant the same thing, but Alfred the Great, the founder of the W. Saxon prose, the Abbot Aelfric, a W. Saxon writer, and the first Eng. Christian king Ethelbert of Kent called their language *Englisc*. *Lingua Saxonica* or *Saxonice* is rarely used as a generic term, but it is more often employed in specific reference to the Saxon dialects. The term A.-S., coined in the 17th cent., is rather misleading; it is sometimes used in opposition to 'continental Saxon.' The term more commonly employed is O.E. (see **ENGLISH LANGUAGE AND ENGLISH LITERATURE**).

O.E. soon became split up into various dialects, which can be distinguished into three or four groups: the S. Eng. dialects and the Anglian dialects, divided into Northumbrian (dialects of the Angles N. of the Humber) and Mercian (the dialects of the Angles of the Midlands). There were probably also E. Anglian dialects, but we do not know anything of their early form. We have no written documents in O.E.

of the first few hundred years. The earliest documentary knowledge of this language consists in some names of places and persons which appear in a few Lat. charters of the late 7th and the early 8th cents. Of the S. dialects the most important by far is that of Wessex, or W. Saxon, which became dominant for literary purposes during the reign of King Alfred (871-99), and maintained its supremacy until the close of the O.E. period. Another form of A.-S. is known as S. Patois (of the Blickling Homilies and the Harleian Glosses). Kentish and the Anglian dialects are mainly known to us in charters, glossaries, glosses, or paraphrases of the Gospels and the Psalms. Therefore the study of literary O.E. is mainly based on W. Saxon.

Like German, Latin, and Greek, and unlike modern English, W. Saxon was a highly inflected language. It retained the elaborate system of genders; its nouns were masculine, feminine, or neuter; and they had four case-forms in the singular and plural, together with corresponding ones of the dual number, which has disappeared in all modern Germanic languages except Icelandic. The adjectives agreed with the nouns, and were declined with them. In the conjugation of the verbs there were twice as many forms as in Mod. E.: as in German there was a large number of verbs, called 'strong,' in which changes in tense were indicated by internal vowel change (some Mod. E. words still show the basic similarity of pattern, e.g. write, wrote, written). There existed a second larger group of verbs called 'weak,' which used a different method for forming tenses, a suffix, consisting in a syllable containing a dental consonant (-de, -ode, -le). The verb had a special infinitive form (-ian, -an, -n), and a past participle (prefix *ge-*).

See ENGLISH LANGUAGE; for A.-S. literature see ENGLISH LITERATURE.

Anglo-Saxons, see SAXONS.

Angmering: 1. Vil. of Sussex, England, near the coast, 3 m. from Worthing. Pop. 1270.

2. *A.-on-Sea*, or *E. Preston*, modern coastal resort near A. vil.

Angoche, see ANTONIO ENES.

Angola, name applied to the Portuguese possessions on the W. African coast, lying between the Congo and Benguela or from the border of Belgian Congo to Cape Frio. A. was discovered in 1482 by the Portuguese mariner, Diogo Cao, and exploited by slavers. Its landward boundaries are the Fr. Congo, the Belgian Congo, Rhodesia, and SW. Africa. It has a coastline of 1000 m. on the Atlantic Ocean. The waters of the Rua Cana Falls and the Kunene R. are shared jointly for irrigation and power purposes by Portugal and the Union of S. Africa. The area is about 785,000 sq. m. and it is divided into 12 administrative dists. and ruled by a high commissioner. The coast is barren and unhealthy, but inland the country is well watered and sisal, rice, and sugar are widely grown. The 3 chief rvs. are the Kwanza, the Kunene, and the Kwango. In the mts are various mines, chiefly copper, lead, and sulphur. The

resources of the country are not by any means fully developed under Portuguese rule. The cap. is Luanda, formerly São Paulo de Luanda (pop. (1950) whites, 20,170; all others, 141,037). Luanda has 600 metres of quays with depths varying from 11½ to 5½ metres. The other chief tns are Kabinda, Benguela, Nova Redondo, and Nova Lisbon, formerly Humambo, which are also seaports. The chief products are maize, coffee, rubber, and coco-nuts as well as the products noted above; and some of the best agric. lands are traversed by the Benguela railway running from Lobito Bay to Katanga (and thence to Beira)—the last-named being a mineral dist. Benguela's trade has declined, but it still exports considerable quantities of beeswax, sugar, and maize, though ships have to lie 2 m. out. the port being on a roadstead. Lengue, Cubal, S. Pedro, and Ganda are other trading centres. There is a twice weekly air service from Luanda to Leopoldville, a weekly service to Lisbon, and a good internal air service. The Mossamedes railway goes inland from Mossamedes to Sá da Bandeira (Huila).

Consult Sir Harry Johnston, *The Colonisation of Africa*, 1899; A. Nekreiros, *Angola*, 1901; F. I. de P. Conceiro, *Angola*, 1910; A. Marvand, *Le Portugal et ses colonies*, 1912; H. Marquardson, *Angola*, 1920; J. C. B. Statham, *Through Angola*, 1922; W. D. Hamblly, *Ovimbundu of Angola*, 1934.

Angora, see ANKARA.

Angostura (Santo Tomé de la Nueva Guayana), see CIUDAD BOLIVAR.

A. Bark is derived from *Cusparia febrifuga*, a species of S. Amer. tree of the family Rutaceae. It is used in the manuf. of drugs which have a tonic effect, but its value as a febrifuge is small. Trinidad is the source of *A. bitters*, the manuf. of which was transferred to the is. from A. or Ciudad Bolívar in 1875, owing to the troubled state of Venezuela.

Angoulême, Charles de Valois, Duke of (1573-1650), Fr. courtier, was the natural son of Charles IX of France and his mistress, Marie Fouchet. He plotted against Henry IV, and was imprisoned from 1605 to 1616. He was then released, and spent the rest of his life as a soldier and diplomat of France, taking part in the Thirty Years War and being in command at the siege of La Rochelle. He was an author of some note.

Angoulême, Duchesse de Montmorency et d', see DIANE DE FRANCE.

Angoulême, Louis Antoine de Bourbon, Duke of (1775-1844), Fr. soldier and prince, eldest son of Charles X of France, b. Versailles. He left France at the outbreak of the revolution. In 1799 he married his cousin, Marie Thérèse, and on the recall of his uncle, Louis XVIII, to France he was made lieutenant-general of the kingdom. He attempted to oppose Napoleon's return in 1815, but was deserted by his troops. In 1823 he commanded the Fr. expedition to Spain. After the revolution of July 1830 he retired with his father, Charles X, into exile. He d. at Görz.

Angoulême, Fr. tn, cap. of the dept of Charente, on the Charente. It was the anc. cap. of the prov. of Angoumois (q.v.). The tn stands on a 317-ft high promontory. It is a bishopric, and has a 12th-cent. cathedral, with a very richly decorated façade. Brandy is produced, and pottery, paper, and metal goods are manuf. Margaret of Navarre (q.v.) was b. here. Pop. 44,200.

Angoumois, anc. Fr. prov., corresponding to parts of the present depts of Charente and Dordogne. It was united to the crown in 1714. The cap. was Angoulême (q.v.).

Angra (Do Heroísmo): 1. Administrative dist. of the Azores (q.v.), comprising the is. of Terceira, Graciosa, and São Jorge. Area 268 sq. m.; pop. 86,600.

2. Seaport in the Azores, at the head of a deep bay on the S. shore of Terceira is. It has a 16th-cent. cathedral and a 17th-cent. castle. There is a trade in agric. produce, wine, fruit, tobacco, and embroidery. Pop. 11,000.

Angra Pequena, bay in SW. Africa, lat. 26° 38' S., long. 15° E., on which stands the tn of Lüderitz. This was estab. in 1883 by a Bremen merchant of that name, and in 1884 the dist. was proclaimed a Ger. protectorate. The surrounding country is desert, and the harbour itself is not good, freight having to be landed by lighters. The tn is connected by rail with the S. African system to Keetmanshoop by a service which runs thrice weekly.

Angrézabad, see ENGLISH BAZAR.

Anгри, It. tn in Campania (q.v.), 10 m. NW. of Salerno (q.v.). Pop. 6000.

Ångström, Anders Jonas (1814-74), Swedish physicist, b. Lögddö, Medelpad; studied at Upsala Univ. From 1867 to his death he was secretary to the Royal Society of Sciences at Upsala, at which univ. he had already occupied sev. posts. He was the first to examine the spectrum of the aurora borealis in 1867, and he detected and measured the characteristic bright line in its yellow-green region. His chief work is *Optiska Undersökningar*, on spectrum analysis. The unit for expressing wave-lengths of light is named after him. $1\text{Å} = 10^{-8}$ cm. See also PHYSICAL UNITS.

Anguilla, or Snake Is., dependency of St Kitts-Nevis, Leeward Is. (Brit. W. Indies), has an area of about 35 sq. m. The surface is flat, some cattle are pastured there. Sea Is. cotton and salt are the chief products. Pop. 5050.

Anguis, genus of reptiles of order Lacertilia and family Anguillidae. *A. fragilis*, the slow-worm, is a limbless, snake-like lizard with well-developed eyes, found in Asia, Europe, and America. The genus is viviparous, the female producing from 6 to 20 silvery young.

Angular Motion, motion of a body about a fixed axis. Different parts of the body describe arcs of different lengths in the same time, but the angular velocity is the same for all points of a rigid body. Angular velocity is the angle turned through per sec. by a line in the body perpendicular to the axis of rotation. It is

usually measured in radians per sec. A radian is $180^\circ/\pi$, or $57^\circ.29578$. Thus, if a body rotates through 30° per sec., its angular velocity is $30/57.29578 = 0.5236$ radians per sec.

Angus, David McKenzie (1855-1901), bookseller, b. Thurso, Scotland. He was apprenticed to E. and S. Livingstone, booksellers in Edinburgh, and in 1882 migrated to Sydney, Australia, where he resumed his career, later owning his own shop. In 1886 he was joined by **George Robertson** (1860-1933), b. Halstead, England, and trained by James Macle-hose, bookseller to the Univ. of Glasgow. Together they founded the firm of Angus & Robertson, booksellers and, later, publishers. A. relinquished his share in the business in 1900 and returned to England, where he d. in the following year. The firm fl. and is now the largest bookselling and publishing organisation in Australia, with H.Q. in Sydney and branches in Melbourne and London. The subsidiary of the firm, the Halstead Press, is named after G. Robertson's bp.

Angus, Marion (1866-1946), poetess, b. Aberdeen, daughter of a minister. Brought up at Arbroath, she did not start writing poetry seriously till she was over 50; her themes are nearly always sad. Her works include *The Lill*, 1922, *The Tinker's Road*, 1924, *Sun and Candlelight*, 1927, *The Singin' Lass*, 1929, *The Turn of the Day*, 1931, and *Lost Country*, 1937. *Selected Poems* with a memoir appeared in 1950.

Angus, formerly Forfarshire, maritime co. of E. Scotland, bounded by Aberdeen and Kincardine on the N., the N. Sea on the E., the Firth of Tay on the S., and Perthshire on the W. The surface is varied; the foothills of the Grampians (q.v.) lie in the N. and between the heights are the fertile valleys of Glen Isla, Glen Clova, Glen Prosen, and Glen Esk. The Sidlaw Hills (q.v.) run parallel to the former range, and between these lies the wide valley of Strathmore. The chief streams are the Isla and the N. and S. Esk; the prin. lochs are Lintrathen, Forfar, Lee, and Balgavies. Sandstone and granite are quarried in the hills. Wheat is grown extensively in the valley of Strathmore, and oats and potatoes are cultivated. The salmon and herring fisheries are important, but the chief industry is flax and jute manuf.; Dundee is the centre of the linen and jute trade. At Carnoustie there is a noted golf course. The chief tns are Forfar (the co. tn), Dundee, Arbroath, Montrose, Brechin, Carnoustie, Monifieth, and Kirriemuir. With Kincardine the co. returns 2 members to Parliament. Area 885 sq. m.; pop. 275,000.

Angussola (or **Angusciola**), **Sophonisba** (c. 1535-c. 1625), It. portrait-painter, b. Cremona. Of her Van Dyck is said to have declared that he learnt more from her conversation on art than from the best masters. She was called to the Sp. court by Philip II to paint portraits of himself and his queen.

Anhalt, ter. in Germany on the W. bank of the Elbe (q.v.), now mainly in the dist.

of Halle (q.v.). Until 1918 it was a duchy, and consisted of E. and W. A. and sev. small enclaves in Prussian Saxony (q.v.). The ruling family had various branches, of which the prin. were A.-Dessau, A.-Zerbst, and A.-Köthen. Until 1918 the state religion was Protestantism. Area 893 sq. m.; pop. Dessau (q.v.).

Anhima Cornuta, see HORNED SCREAMER.

Anhinga, Amer. snake-bird, darter, or water-turkey (*A. anhinga*), akin to the cormorants.

Anholt, small Dan. is. in the Cattegat. It was occupied by the English from Mar. 1811 to Jan. 1814. Area 8 sq. m.; pop. 225.

Anhui, see ANHWEI.

Anhui, prov. of China, bounded on the E. by the provs. of Kiangsu and Chekiang, on the W. by Hupeh and Honan, and on the S. by Kiangsi. It is watered by the Yangtze, which flows through the fertile tea-growing dists. of the prov. Other products are wheat, cotton, rice, and indigo. The prov. is mountainous in the SW., reaching an elevation of over 7000 ft. The N. section is drained by the Huai H. Iron and coal are mined. Its cap. is Hefei, which has railway communication with Nanking. Other tns are Anking, Wuhu, Pengpu, Hsuanchen, and Ch'imen. The prov. is crossed by 3 railways. Area 55,692 sq. m.; pop. (1954) 30,343,637.

Anhydride, or anhydrous acid, term applied to compounds formed by the dehydrating of acids, or which represent in their composition the acid minus water. Thus sulphuric A. is $\text{SO}_3 = \text{H}_2\text{SO}_4 - \text{H}_2\text{O}$.

Anhydrite, mineral consisting of calcium sulphate, CaSO_4 , but differing from gypsum in that it contains no water of crystallisation. The colour is white, red, grey, or blue, and it usually contains a small amount of sea-salt, being found in salt deposits. Nearer the surface the mineral absorbs water, and is converted into gypsum; its liability to this change makes it unsuitable for building purposes.

Ani, anct. ruined city of Armenia, about 25 m. SE. of Kars, on the Arpaçai. During the Middle Ages it was the seat of the Bagratide kings of Armenia. About 1062 it was taken and pillaged by the Seljuks, and during the next 2 cents. it was repeatedly sacked. Its ruin was finally completed by an earthquake. Sev. interesting remains (of buildings and the city wall) are still to be seen.

Aniche, tn, dept of Nord, France, 8 m. ESE. of Douai. Has coal-mines, glass-works, and chemical manufs. Pop. 8300.

Aniello, Tommaso, called by corruption **Masaniello** (c. 1623-47), Neapolitan rebel leader, b. Amalfi and d. Naples. The Duke of Arcos, viceroy of Philip IV of Spain, who was Governor of Naples, levied a tax on fruit and vegetables in 1647. The people, with A., at that time a poor fisherman, as their leader, rose in revolt, and the troops of the viceroy were defeated. As a result, all imposts upon articles of consumption were abolished, and the privileges granted by Charles V were restored. For a short time A. was

master of Naples, but he gave himself up to despotism and excess, and was soon assassinated by the viceroy's agents.

Aniene, or **Teverone** (anct. **Anio**), riv. of Italy, a trib. of the Tiber (q.v.), in the prov. of Rome (q.v.). Since the 3rd cent. its aqueducts have supplied Rome with water, and it is famous for its beautiful cascades at Tivoli (q.v.). Length 73 m.

Aniline, aminobenzene or phenylamine, $\text{C}_6\text{H}_5\text{NH}_2$, first prepared by the dry distillation of indigo, whence it derives its name (Portuguese *anil*, indigo). It is now manuf. by the action of steam and iron scraps, together with a little hydrochloric acid, on nitrobenzene contained in a cast-iron cylinder with a stirring apparatus. Lime is added when the reduction is complete and the A. distilled with steam. A. is also obtained by the electro-reduction of nitrobenzene. An almost colourless oil when pure, boiling point 184°C . A. rapidly darkens on exposure owing to atmospheric oxidation. It is an important starting material for the manuf. of many dyes and intermediates, particularly some of the earliest synthetic dyes. Hence the name 'aniline dyes,' which is now outdated. See DYE.

A. is a colourless liquid, but if not pure it turns brown on exposure to the air, probably owing to the presence of sulphur compounds. It boils at 183° and has a sp. gr. of 1.024 at 16° . It is slightly soluble in water, but is easily dissolved in alcohol and benzene. It is very poisonous if taken internally, and workmen who are engaged in manufs. in which it is used often suffer from headaches and nausea through inhalation of its vapours. It forms salts with the mineral acids, combines with alkyl iodides to form secondary and tertiary amines, and when heated with acetic acid it produces acetanilide or antifebrin.

A. is largely used for the manuf. of dyes and the preparation of benzene derivatives. The so-called A. dyes (see DYES) are not necessarily derivatives of A., but were developed after the study of A. compounds which provided the earliest dyes, e.g. mauveine. *Rosaniline*, or magenta, is produced by the oxidation of A. and toluidine. By substituting methyl groups for hydrogen, the colour becomes reddish-violet and then bluish-violet as the number of methyl groups increases. By substituting ethyl, phenyl, or benzyl groups still more marked changes are produced, so that a series of reds and blues with all their intermediaries can be obtained in substitution products of rosaniline.

Anima Mundi, anct. belief that all the chances and changes of the universe are due to an overruling consciousness, just as the ordering of the body is due to the operation of the human mind. Anaxagoras was among the earliest occidentals to believe that the universe was ordered by a single consciousness or reason. Aristotle held much the same view, but he held that nature itself is a living, conscious being, separate from God, who is a transcendent spirit. The Stoics' belief merged into pantheism, for they conceived of the A. M.

as pure spirit, the one vital force pervading everything. The belief was revived by Cornelius Agrippa (1486-1535), who, however, changed the terminology to *spiritus mundi*; it has been held with slight variations by many moderns, including Bruno, Sebastian Franck, Boehme, Van Helmont, More, and Cudworth.

Animal Flowers, name sometimes applied to the genus *Actinia*, a sea-anemone. The name, of course, originated in the resemblance to a flower of this polyp, which belongs to the animal kingdom.

Animal Magnetism, see HYPNOTISM.

Animal Worship, cult found in most ancient religions, and also at the present day. Men early held that animals had souls (see ANIMISM), and as they were swifter, stronger, and more cunning than themselves, they respected and feared them. Every tribe and div. of the Amer. Indians has its totem, many being animals, which it holds sacred, regarding the animal as its protector and its image as a charm (see TOTEMISM). Similar was the Teutonic use of the boar. A. W. is of 2 main types, that in which the animal itself is worshipped, and that in which the animal is revered as a symbol of a spirit. The prin. animal worshippers now are the Hindus: 'Hera the sacred cow is not merely to be spared; she is, as a deity, worshipped and bowed to daily by the pious Hindu, who offers her fresh grass and flowers. Siva is incarnate in Hanuman, the monkey-god, Durga in the jackal; Ganesa wears the elephant's head; the king of birds, Garuda, is Vishnu's vehicle; the forms of fish, boar, and tortoise were assumed in the avatar legends of Vishnu, which so curiously resemble Red Indian myths.'—Tyler's *Primitive Culture*, 1871. See books listed under TOTEMISM.

Animalculae (dimin. of Lat. *animal*, living being), term formerly applied to the smallest forms of animal life such as can be seen only with the aid of a microscope. They include Bacteria, Protozoa, and Rotifera, and the term is applied in a loose sense to the Infusoria.

Animalcules, Bear, or Sloth, see TARDIGRADA.

Animalcules, Wheel, see ROTIFERA.

Animals (Lat. *animus*, mind), living organisms which are distinguished from plants by their powers of locomotion, capacity for assimilating organic substances, and the absence of the compounds chlorophyll and cellulose. None of these distinctions, however, is complete; either may be unable to move from the spot to which it is attached—plants are usually in this condition, but they frequently have reproductive cells or spores which are free-swimming. Corals remain stationary, whilst amongst plants, diatoms and certain algae and fungi have distinct powers of locomotion; some plants (e.g. the sundew) are insectivorous and digest organic matter; chlorophyll is absent from fungi; the cellulose cell-wall is absent in some plants and present in some A. such as tunicates, or sea-squirts. Both plants and A. frequently live in a parasitic state. A. require to have their

carbohydrate and protein substances already formed for them, and take into their systems in living or dead form pre-existing organic life; all green plants, however, which possess chlorophyll can, with the aid of sun and air, manuf. from inorganic salts their own carbohydrates and protein substance. It is thus in their method of nutrition that A. differ fundamentally from green plants. Both plants and A. are sensitive to external conditions and have an irritable protoplasm. In reproduction there is again great similarity, for in the lowest forms of each, cell-div. may take place or specialised cells may form new life. Higher A. and higher plants differ from one another to a great extent, but the processes of nutrition and reproduction are common to both.

In view of the difficulty of an absolutely distinct line of demarcation, it is justifiable to assert that both forms of life have a common origin and that the processes of differentiation have roughly followed the 2 directions as laid down in the above definition. That both botanist and zoologist consider certain forms to belong to their respective spheres is a gain rather than a loss, and does not disturb the bases of their classification.

In all but the lowest A. the process of life is carried on by a more or less complex machinery of organs—muscles, alimentary canal, heart and blood-vessels, gills or lungs, nervous systems, organs of excretion, and organs of reproduction. But in all A. as in all plants, the effective and essential part consists of protoplasm, and A. exist with structures varying from the mere mass of protoplasm of the amoeba to the highly complex organism of man. See also ARCTIC ANIMALS and CAVE ANIMALS.

Classification. Each large group is divided into phyla, which are divided either into classes containing orders or directly into orders, and these again are divided into families, genera, and finally individual species. In a very broad sense they may be grouped under the heads of Invertebrates and Vertebrates. The following groups or phyla are arranged in order of complexity:

(A) *Invertebrates*. I. Protozoa, a cellular organism such as *Amoeba*. II. Porifera, or sponges. III. Coelenterata, including jelly-fish, sea-anemones, and corals. IV. Platyhelminthes, or flat worms. V. Nemathelminthes, including Nematodes, the round or thread worms. VI. Trochelminthes, including rotifera. VII. Mollusca, including corallines and certain shell-A. VIII. Echinodermata, including star-fishes and sea-urchins. IX. Annelida, including earth-worms. X. Arthropoda, including crustaceans, insects, and spiders. XI. Mollusca, shell-fish, and cuttle-fish.

(B) *Vertebrates*. XII. Chordata, including A. possessing a structure called the notochord, a cord of cells along the middle line on the dorsal side of the enteric cavity, developing into the backbone in vertebrata. It is an extensive and important group, including fishes (Pisces), amphibians (Amphibia), reptiles

(Reptilia), birds (Aves), and mammals (Mammalia). The Tunicata (e.g. sea-squirts) and amphioxus or lancelet possess a notochord, and are simple forms of chordates, resembling in some respects the ancestral Vertebrate. (See AMPHIOXUS.)

Colours of animals. Most of the multicellular A. are coloured in some way or other. But many A. of the marine plankton, such as arrow-worms, heteropod molluscs, copepods, salps, and doliolids are quite colourless and transparent. In other invertebrate A. (sea-anemones, worms, crustaceans, echinoderms, etc.) there are many kinds of pigments in the skin. The vertebrates have developed fewer kinds of skin colouring materials. However, besides these pigments, which are usually carried in definite cells in the skin, there are colours due to the surface structure of the A. The white of fur and feathers may be structural, due to the presence of enclosed air bubbles which reflect all light waves and thus throw back white light. Some of the most striking colours, those shown by the feathers of peacocks, humming birds, and paradise birds and moths are partly due to surface effects. The play of light on the thin layer of horny material on the feathers and the small scales on the wings of these insects gives rise to certain iridescent colours. Horny material covering the sides of chameleons and iguanid lizards gives rise to structural colours which combine with the colours in the pigment cells in the skin. Brown and black colours are due to a dark pigment known as melanin, one of the most common pigments in A. Red and yellow pigments are generally due to carotenoid substances. And mention should be made of the respiratory pigments such as haemoglobin in vertebrates and certain invertebrates and the haemocyanin of arthropods and molluscs. The pink colour of certain fishes and amphibians with transparent skins is due to the red haemoglobin in the blood.

Many A. have the power of changing their colours; notably, certain crustaceans, molluscs, fishes, amphibians, and reptiles. In such species the colour of the body may match the colour of the background and this presumably has some camouflaging effect. For instance, the prawn *Hippolyte* is green when living in green seaweed while on brown and red weed its colour is nicely matched. In the skin of the prawn are cells each bearing red, yellow, and blue pigments. On green weed the red is concealed and the combined colour of the 2 other pigments is, of course, green. Cuttlefishes, squids, and octopuses also have most astonishing powers of quick colour changes.

Flat-fishes are able to match their colour to that of the ground in which they are resting. The chameleon, which has been much studied, has a skin with 4 layers giving colour effects: an upper yellow layer; then in order below this 3 layers giving blue, white, and brown effects. According to the degree of spreading out of the yellow, blue, and

brown colours in the pigment cells, different combined colours are produced. The remarkable way in which the chameleon may change its colour to match its immediate environment is effected through the eye, thence through the brain to nerves controlling the colour cells. Certain colour changes are also produced by the direct effect of light on the skin.

In A. without the power of colour change both the presence of a definite colour pattern and the absence of any such pattern may have a concealing effect. Concerning the latter, the transparent A. of the marine plankton have already been mentioned. Certain butterflies and moths have colour patterns that are so like the trees, etc., on which they rest that they are very difficult to spot. Disruptive patterns (when the colours are arranged in sharply different sections) as in certain coral fishes, birds, and mammals (such as the zebra) are assumed to break up the form of the A. and make them less conspicuous to their predators. Counter-shading in fishes, the back being darker and gradually merging with the white or silver underparts means that when viewed from above it will tone with the sea and when seen from below will match the silvery surface film. Warning colorations are striking colour patterns associated with certain noxious characters such as stings in insects, an unpleasant taste and an offensive smell (as in the skunk). And other creatures, particularly in the insect world, mimic these warning patterns.

There are a number of species of syrphid flies (hover-flies) some of which look like wasps and some like bees. But besides mimicry in colour patterns there may be mimicry of behaviour. Finally it must be emphasised that colour patterns are not only of use in camouflage, etc., but generally play an important part during the breeding season. The elaborate displays during the courtship of birds is an obvious example but the precise study of this subject is only just beginning. See H. B. Cott, *Adaptive Colouration in Animals*, 1940, and E. M. Stephenson and C. Stewart, *Animal Camouflage*, 1946.

Animals, Cruelty to. It was not until the beginning of the 19th cent. that any measures were taken either for the prevention or for the punishment of C. to A. England took the lead, and founded the Royal Society for the Prevention of C. to A. (R.S.P.C.A.). 1824, and Scotland followed in 1839. Later the U.S.A., France, and Germany had organisations for the prevention of C. to A. Few countries are now without such an organisation; the R.S.P.C.A. has branches in Commonwealth countries. The various statutes on the subject were consolidated in the Protection of Animals Act, 1911. All domestic A. come within the statutory provisions and also wild A. if in captivity or confinement, or maimed, pinioned, or subjected to any contrivance for the purpose of preventing their escape from captivity. The Act of 1911 re-enacts the general provisions of the old Acts by which A. may not be ill-treated, overdriven, or kept without proper food and water. It

is also forbidden to perform painful experiments on living A. except under licence from the Home Office, and then only in accordance with statutory regulations. An application for such licence and a certificate for any exception from the regulations must be signed by the president of some scientific body such as the Royal College of Physicians and Surgeons. By the Protection of Animals (Anaesthetics) Act, 1954, anaesthetics must be used for certain specified operations on A. Besides the more obvious forms of cruelty, it is also forbidden to convey any animal in such manner as to cause it unnecessary suffering; or to administer poisonous or injurious drugs or to perform an operation without due care and humanity, while bull-baiting, bear-baiting, and cock-fighting have long been prohibited. Other offences are selling poisoned grain or flesh for animal food and using dogs for draught; while the exhibition and training of performing A. are regulated by the Performing Animals (Regulation) Act, 1925, which provides for the registration with a local authority of persons so training or exhibiting A. People convicted of C. to A. may, under the Act of 1933, be prohibited from keeping A. Under the Protection of Animals Act, 1934, certain public contests, exhibitions, and performances in which A. are used are prohibited. These include throwing or casting with ropes or other appliances any unbroken horse or untrained bull; or wrestling, fighting, or struggling with an untrained bull; or riding or trying to ride a horse or bull which, by appliances or treatment involving cruelty, has been stimulated to make it buck. On a conviction under the Act of 1911 the court may order the destruction of any animal if satisfied that it would be cruel to keep it alive, or deprive the offender of its ownership. Compensation up to £10 may be awarded for any damage or injury to the animal or any person or property. A constable may, on getting a veterinary certificate, cause an injured animal to be slaughtered. The enforcement of the statutory provisions relating to C. to A. is mainly undertaken by the R.S.P.C.A. with the assistance of the police. By the Protection of Animals (Amendment) Act, 1954, the fine for offences of cruelty is increased to a maximum of £50. Further, this Act permits a court on a second or subsequent conviction for cruelty to disqualify the offender from having custody of any A. Many prosecutions are also instituted under the Protection of Birds Act, 1954, which includes the offences of keeping birds in very small cages and the killing and taking of wild birds. Homes for stray dogs and cats have been founded in Great Britain and in the U.S.A. and elsewhere; animal welfare organisations provide free treatment for sick and injured A. of needy folk.

Animi, term applied to various oleoresins, sometimes to a variety of copal, but most frequently to elemi. Brazilian A. is the product of a leguminous tree called *Hymenaea courbaril*.

Animism (Lat. *anima*, soul), title first

given by the Ger. chemist Stahl in the early 18th cent. to the doctrine that all phenomena peculiar to the animal world are produced by an immaterial 'soul' or vital principle distinct from matter. E. B. Tylor, however, in his *Primitive Culture*, 1871, gave it to the attribution of a living soul (q.v.) to inanimate objects and natural phenomena, and the term is used now generally in that sense. Tylor postulates A. as the first requirement of religion, stating that nothing below this should be considered as religion. See also FETISHISM and RELIGION. See E. B. Tylor, *Primitive Culture*, 1871; Sir James Frazer, *Golden Bough*, 1890-1915; R. R. Marett, *The Threshold of Religion*, 1914.

Animuccia, Giovanni (c. 1500-71), It. musician and composer, b. Florence. In 1555 he was appointed *maestro di cappella* at the Vatican. His hymns, *Laudi spirituali*, are said to be the origin of the oratorio. He composed a number of masses, motets, magnificats, madrigals, and other works.

Anio, see ANIENE.

Anions, see IONS.

Anise, or *Pimpinella anisum*, ann. species of the Umbelliferae found in the S. of Europe. The fruit is known as aniseed, and is much used in flavouring.

Anjou, old prov. of France, now covered by the dept of Maine-et-Loire, and parts of those of Indre-et-Loire, Sarthe, and Mayenne. In Rom. times it was the ter. of the Andecavi, whence the name of Angers, the anet cap., is derived. The son of Geoffrey V of Anjou by Matilda, daughter of Henry I of England, came to the Eng. throne as Henry II, and thus founded the Angevin line of kings. In 1204 Philip Augustus of France took it from King John. It was later bestowed as a fief upon Charles, the son of Louis VIII, who, conquering Naples and Sicily, became there the founder of the Angevin line. Charles was also count of Provence, and for nearly half a cent. the 3 were united. Margaret, daughter of Charles II of Naples, took A. with her as part of her dowry to Charles of Valois. In 1328, on the accession of her son, Philip VI of France, it was joined to the Fr. crown. In 1360 it was made a duchy, and with Louis I returned to the dominion of Naples. In 1480 A. was finally annexed to the Fr. crown, and the title of Duke of A. became an honorary title given to princes of the royal family of France.

Anjouan, see JOHANNA.

Ankara, or **Angora**, tn in Asia Minor and cap. of the il of the same name and, since 1923, of Turkey and H.Q. of the Republican Gov. The city was until recently poorly laid out and of primitive sanitation. Kemal Atatürk planned a new city on the Amer. system and, by the time he d., many modern improvements had been carried out. Its anet name was Ancyra (q.v.), and it was the cap. of the Rom. prov. of Galatia Prima. A temple, now in ruins, contains the *Monumentum Ancyranum*, inscribed with a record of the reign of Augustus Caesar. A. is just over 200 m. ESE. of Constantinople. It was the scene of a great battle in 1402

between the Turks and the Tatars, when the former were defeated. It is famous for its breed of goats, which have long, silky hair and are very valuable. This hair is known as mohair in its manuf. state. Pop. of fl 1,120,622; of tu 435,151.

Anker, measure of wine and spirits, containing about 10 wine gallons, formerly used in England. It was borrowed from the Dutch, and is still used in Holland, Denmark, Sweden, etc. The name is also given to a cask containing an A.

Ankerite, naturally occurring carbonate of lime, iron, and magnesia. Found in impure limestones and in veins and concretions. Crystals are commonly rhombohedral with curved faces.

Ankh, in anc. Egypt, the symbol of life.

Anking, see **HWANGING**.

Anklam, Ger. tn in the dist. of Rostock, on the R. Peene 4 m. from its outlet on the Stettiner Hafl (q.v.), 65 m. E. by S. of Rostock (q.v.). It was severely bombed during the Second World War. There are shipbuilding and engineering industries. Pop. 20,000.

Ankle, joint between the leg and the foot. It is a hinge joint with backward and forward motion, although a certain amount of lateral motion is possible. There are 3 ligaments, the anterior, internal, and external. As the A. is the joint which most often has to bear the whole weight of the body with the greatest amount of leverage, sprains are a common occurrence. Hot fomentations should be applied if the swelling is considerable, and not too severe bandaging resorted to. Complete rest for the joint is the first desideratum, after which gentle massage should be employed. Passive movements of the muscles should precede any effort to move the joint by the muscles alone, and exercises gradually proceeded with until the weight of the body can be endured.

Ankober, or **Ankobor**, tn of Ethiopia, in Shoa, situated about 8500 ft above the sea, in lat. 9° 34' N. and long. 39° 54' E. It contains a royal palace, the climate is good, and the pop. was once considerable.

Ankole, mountainous dist. of Uganda bordering on Lake Edward and centred on Mbarara; also a Bantu kingdom of W. Uganda. The king, the *Mugabe* ('giver'), is head of a state comprising Negro peasants and non-Negro aristocrats, the latter herding cattle and probably being of anc. Egyptian (Hamitic) origin. See K. Oberg, 'The Kingdom of Ankole,' in Fortes and E. E. Evans-Pritchard, *African Political Systems*, 1940.

Ankylosis (Gk *ankulos*, curved), immovable union of 2 bones naturally connected to form a movable joint, caused by an osseous growth in *true A.*, by a fibrous growth in *false A.* It is liable to occur after a fracture in the neighbourhood of the joint, and after inflammatory conditions in a joint or the ends of bones forming the joint, as in tubercular infection and rheumatoid arthritis. *A.* may occur in any joint which is immobilized in one position for a long time. Because of the rigid position of the limb, *A.* naturally attacks the Indian fakirs, whose

religious devotion condemns them to remain motionless for years. Cases are on record of a general *A.* of all the bones of the human body. Sometimes a joint is ankylosed deliberately as a surgical procedure when permanent immobilization is desirable. The operation is known as *arthrodesis*.

Ankylostomiasis, or **Uncinariasis**, morbid condition produced by the presence of the parasite *Ankylostoma duodenale* (hook-worm) in the human intestine. The parasite is found in tropical countries, and is also known in Germany, Belgium, Switzerland, England, and the S.E. section of the U.S.A. The disease is most common amongst brickmakers, tunnel-workers, and miners, and is sometimes known as miner's anaemia. The eggs of the parasite are expelled from the intestine with the faeces, and develop in warm, damp soil into larvae which can infect new hosts by boring through the skin, usually of the foot. The larvae are taken in the blood to the lungs, whence they are coughed up into the mouth and then swallowed. In the stomach and intestine they become the mature hook-worms, 1-2 cm. long, which attach themselves by their hooks to the mucous membrane, producing internal haemorrhage, often fatal; milder attacks cause anaemia and vomiting. Moreover it is impossible for infected individuals to lead a normal, active existence, and attacks of the parasite were responsible for such epithets as 'poor white trash,' formerly applied to dwellers in the S. U.S.A. Vermifuges and purgatives remove the worm from the intestine; carbon tetrachloride is much used nowadays, and is extremely effective. Infection can be prevented by the wearing of leather footwear and faeces should be properly disposed of by adequate sanitation. The disease may also be spread by the practice in many countries of using human manure for the growing of crop plants.

Ann, **Annal**, or **Annatine**, in Scots law, is the half-year's stipend payable for the vacant half-year after the death of a minister to his family or next of kin. As it belongs to his next of kin, and not to the minister himself, it is not assignable to him, nor can it be attached for his debts. It is not payable to widows of ministers admitted after 1925.

Ann Arbor, city, cap. of Washtenaw co., Michigan, U.S.A., on R. Huron, in an agric. and fruit-growing area, 38 m. W. of Detroit. It manufs. metal products, chemicals, and precision instruments, and is the seat of the univ. of Michigan (19,000 students). Here is the Nichols Arboretum and there is an ann. May Festival. Pop. 48,300.

Anna, Indian and Pakistani coin, value about 1d., the sixteenth part of a rupee.

Anna Comnena (1083-1148), daughter of the Emperor Alexius I (Comnenus), famous as probably the first woman historian. Having unsuccessfully attempted, first by means of influence over her father and secondly by means of conspiracy, to obtain the crown for her husband, the historian Nicephorus Byzantius, she fled to a convent, where

she wrote her hist. called the *Alexiad*. It consisted chiefly of a panegyric of her father's reign and is not now generally considered a serious historical contribution.

Anna Ivanovna (1693-1740), Russian empress, daughter of Ivan V, elder brother of Peter the Great. She married a Duke of Kurland and was soon widowed. In 1730, being offered the crown of Russia, she accepted, signing articles which limited her power in favour of the aristocracy, but which she soon repudiated. She was cruel and vindictive and entrusted the gov. of the country entirely to her favourite, Biron (q.v.), who instituted a reign of terror.

Anna Leopoldovna (1718-46), Ger. princess, grand-daughter of Russian Tsar Ivan V (elder brother of Peter the Great). The Empress Anna Ivanovna, her aunt, left the throne to A. L.'s infant son, Ivan VI. A. L. overthrew the regent, Biron, and was regent herself for a year, but in 1741 was in turn overthrown by Peter the Great's daughter, Elizabeth, who had the infant emperor imprisoned. She eventually died in banishment.

Annaben, see ANNABON.

Annaberg, Ger. tn in the dist. of Karl-Marx-Stadt, in the Erzgebirge (q.v.), 18 m. S. by E. of Karl-Marx-Stadt (q.v.). It was founded in the 15th cent. as a silver-mining tn. There are also uranium, tin, and cobalt mines in the dist. Pop. 20,000.

Annabon, Annaben, Annobon, or Anobon, Sp. is., gulf of Guinea, W. Africa, 4 m. long, 2 m. wide. It is mountainous (3000 ft.) and has a pop. numbering between 2000 and 3000. On it is situated the tn of San Antonio de Praia.

Annah, see ANAH.

Annals were formerly records of events (in chronological order) which happened during the year, and the Chinese, Assyrians, Egyptians, Greeks, and Romans had their A. According to Cicero (*De Oratore*, xii) it was the custom from the commencement of the Rom. state down to the time of Publius Murius for the pontifex maximus to draw up an account of the transactions of the past year to be publicly exhibited. These A. were afterwards called *Annales Maximi*, the Great A., and it is probable that they were the same as those referred to by Livy as *commentarii pontificum*. *Annales Gentium* and *Annales Consulares* were written by such men as G. Calpurnius Piso, consul 67 BC, and contained the hist. of Rome in chronological order. Later the term A. was given to any historical work written in chronological order, e.g. the A. of Tacitus; and now it is frequently used of an account of events digested into so many successive years, as the *Eccles. A.* of Baronius and the *A. of Scotland* by Sir David Dalrymple, or of a periodic pub. containing records of discoveries, transactions of societies, etc., as the *A. of Science*.

Annam, one of the 3 regions (Tonking, A., and Cochín-China) into which France divided Viet Nam during the 19th cent. A. and Tonking became Fr. protectorates,

while Cochín-China was made a Fr. colony. The name A. was frequently used to include the whole of Viet Nam. A. extends northward to Tonking, southward to Cochín-China, being bounded on the W. by Laos and on the E. by the China Sea. A range of high, jungle-clad mts runs from N. to S. along the W. side, so that almost the entire pop. lives in the strip of low-lying, cultivable land between the mts and the sea. This coastal tract is crossed by sev. short rvs. unsuitable for navigation. In 1937 the inhab. of



Paul Popper

ANNAMESE FISHERMAN

A. numbered 5,656,000, but there have been great shifts in pop. since then and no further census has been taken. The cap. of A. is Hué, the seat of the emperors of the Nguyễn dynasty, and the prin. ports are Tourane and Qui-nhon. The soil is rich and the agric. products include rice, fruits, cotton, sugar, tea, silk, coffee, tobacco, cinnamon bark, and areca nuts. Coastal fishing is carried on. The frontier between Communist N. Viet Nam and non-Communist S. Viet Nam was estab. by the Geneva Conference of 1954 along the 17th parallel and cuts A. in two. The N. part is now governed from Hanoi and the S. part from Saigon. The terms Trung-bô or Central Viet Nam are gradually replacing the name A. See VIET NAM.

Annamaboe, Ghana (Gold Coast), tn 10 m. E. of Cape Coast Castle, W. Africa. It has a strong fort and a good breakwater. Pop. 5000.

Annan: 1. Anc. royal burgh of Dumfriesshire, Scotland, on the R. Annan, 16 m. S. of Dumfries, with boiler and glove factories, a fishing industry, and

cattle and sheep markets. A. is in the Dumfriesshire parl. area. Pop. 4031.

2. Riv. of Dumfriesshire, Scotland, rising in the Moffat Hills and flowing S. for 40 m. to enter the Solway Firth at the tn of A. Annandale is largely rural in character.

Annapolis, cap. of Maryland, U.S.A., port of entry and co. seat of Anne Arundel co. It is on the Severn R., 23 m. SW. of Baltimore. The U.S. Naval Academy was founded here in 1845. The students, formerly called cadets, are now called midshipmen. Two are allowed for each senator, representative, and delegate in Congress, 2 for the dist. of Columbia, and 5 each year for the U.S.A. at large. After a course of 4 years the midshipmen go up for examination, and those who pass are appointed in the lower line of the navy. The city is a port of entry and a trade and shipping centre for a truck- and fruit-growing region; it has a sea-food industry. Pop. 10,047.

Annapolis Royal, port of entry of Nova Scotia, Canada, co. seat of A. co. The oldest settlement in Canada, founded by the French in 1605 under the name of Port Royal. Fort Anne is a natural hist. park. A. valley is famed for its apples and mixed farming. Pop. 784.

Annapurna, Himalayan mt in N. Nepal, lat. 28° 40' N., long. 83° 50' E.; height 26,493 ft. It was the first peak of 26,000 ft. to be climbed. The summit was reached on 3 June 1950 by Maurice Herzog and Louis Lachenal of the Fr. Himalayan Expedition. The descent was marred by misadventure, foul weather, and benightment; severe frost-bite crippled the climbers. See M. Herzog, *Annapurna*, 1952.

Annat, see ANN.

Annates, see FIRST-FRUIT.

Anne (1456-85), Queen of England, daughter of the Earl of Warwick (the king-maker). She was betrothed to Edward, Prince of Wales, but after his death at Tewkesbury in 1471 married Richard of Gloucester (1474). She became queen when he seized the throne as Richard III, 1483.

Anne (1665-1714), Queen of Great Britain and Ireland, b. London, the second daughter of James II and Anne Hyde. She was educ. as an Anglican, and her religion was the only subject on which she seems to have had strongly consistent views, from which none of her favourites could shake her. In 1683 she married Prince George of Denmark, who showed little interest in state affairs. The marriage seems to have been a happy one, but of the couple's 17 children only one, Prince William, survived infancy, and he d. at the age of 11. Soon after A.'s marriage, the future Duchess of Marlborough, Sarah Churchill, was appointed to her household, and soon gained enormous influence over her, which she used for personal and political ends.

During her father's reign A. led a secluded life, having little interest in the glamour of the court, but she supported the accession of her brother-in-law William of Orange, and her sister Mary, and

on William's death in 1702 A. succeeded him on the Eng. throne. The Marlborough influence declined from about 1707, and after a particularly violent quarrel the duchess was dismissed from court in 1710. Abigail Masham (q.v.) became the queen's new confidante, and used her influence to further the Tories.

It is clear that A. was continually beset by conscientious worries on the succession question, her feelings of family loyalty convincing her that the succession should revert to the son of her father's second marriage. But before her death (1714) she seems to have tacitly recognised the Hanoverian claim.

A.'s reign is notable for the bitter party faction, for which her favourites were at least partially responsible, and for the glorious Brit. military victories won in Europe by Marlborough. It was a reign rich in literary talent. In an epoch of low political and personal morality, the private life of the queen was exemplary, and her religious convictions were sincere if narrow in character. See life by M. It. Hopkinson, 1934.

Anne Boleyn, or **Bullen**, see BOLEYN, ANNE.

Anne Elizabeth Alice Louise, Princess (1950-), younger child and only daughter of Queen Elizabeth II and the Duke of Edinburgh, b. Clarence House, London.

Anne Hathaway's Cottage, see SHOTTERY.

Anne of Austria (1601-66), Queen of France, eldest daughter of Philip III of Spain; she married in 1615 Louis XIII of France, who detested Austria. Largely owing to the influence of Richelieu the marriage was very unhappy. On the death of Louis XIII she became regent for the young king, Louis XIV, adopting as her minister Mazarin (q.v.). She was entirely under Mazarin's influence, and may have actually married him, though there is no positive evidence of this. On his death in 1661 she retired to a convent, where she d. See life by M. Buchanan, 1937.

Anne of Cleves (1515-57), Queen of England, fourth wife of Henry VIII. She was the daughter of John of Cleves, a powerful supporter of Protestantism in W. Germany, and the marriage was arranged by Thomas Cromwell (q.v.). It took place in Jan. 1540, but Henry seems to have found her completely unattractive, though his unwillingness to become allied with the Ger. Protestants was probably an equal reason for his having the marriage annulled by Parliament in July 1540. A. was given a pension on condition that she remained in England. She d. at Chelsea and was buried in Westminster Abbey.

Anne of Denmark (1574-1619), Queen of Great Britain, daughter of Frederick II of Denmark and Norway, and wife of James I of England and VI of Scotland, whom she married in 1589. She was later suspected, probably correctly, of being a secret Catholic. She bore James 5 children, of whom 2 survived, Charles I and Elizabeth of Bohemia. A.'s extravagance was the subject of unfavourable

comment by contemporaries. She seems to have had little or no influence on state affairs.

Annealing, process to which glass and metals are subjected, which consists in heating and subsequent cooling. During the fabrication of an article from glass, internal stresses are developed which render the glass very brittle. These stresses are removed and the brittleness decreased by heating the article uniformly to a temp. where the glass just begins to soften followed by slow cooling. Metals become hard when they are deformed during fabrication. A stage is reached where further deformation without cracking can be carried out only after softening by A. Similarly, it is found that the links of a metal chain harden during use, so that it is no uncommon thing for a chain to be re-annealed after it has been in use for some time to ensure that toughness and ductility are maintained. See also METALLURGICAL HEAT TREATMENT and METALLURGY.

Anney, Fr. tn, cap. of the dept of Haute-Savoie. It is the seat of a bishop. A pleasant old tn, in beautiful surroundings, it is a popular tourist resort. There are textile and metal manufs. Pop. 26,700.

Annelida (Lat. *annellus*, little ring), phylum of animals, consisting of segmented worms most of which bear minute spines or setae by which locomotion is assisted; the blood is usually red, and the perivisceral cavity is part of the coelom. Usually the A. are aquatic, but in some cases they are terrestrial (earthworms); some species are hermaphrodite. The nervous system consists of a pair of preoral ganglia connected by commissures with a pair of ventral nerve cords, which generally expand into a pair of ganglia in each segment. There is a vascular system in most A. and respiration is often effected by means of gills; the alimentary system contains a tubular canal opening in the first segment as the mouth, and in another as the anus. Reproduction may take place sexually or asexually by budding; in many instances, if a worm is cut in two each part will produce the missing segments. These animals generally hide themselves by means of burrowing, but some may form round themselves a dwelling made of exudations from their bodies and accumulated external material. The 3 main groups of A. are Polychaeta, all marine, examples being rag-worms, lug-worms, and tube-worms; Oligochaeta, nearly all land and freshwater forms, e.g. earth-worms; and Hirudinea, leeches.

Annexation, term applied in international law to the act by which a nation adds to its terr. lands previously independent or in the possession of another state. It may be the result of conquest, of voluntary cession, or of mere occupation of a previously unoccupied or uncivilised dist. Often, again, it is the sequel to the estab. of a protectorate. Acquisition of ter. by purchase or lease, as a bilateral action, is not spoken of as A. A., except in case of cession, must always be supported with an armed force sufficiently

large to carry the proclamation into effect; otherwise it is purely fictitious. For example, in Sept. 1900 Lord Roberts proclaimed at Pretoria that Great Britain had annexed the ters. of the Transvaal republic. Yet the war continued for another 2 years.

The annexing state takes over all the ter. annexed, with its benefits and obligations, provided they be not contrary to the new order. Laws previously passed are, of course, no longer binding. Questions of detail are perpetually being settled in the courts of various nations, and recourse should be had to these cases for fuller information as to the practice of individual states.

Anniston, co. seat of Calhoun co., Alabama, U.S.A., among the Blue Ridge Mts, 63 m. N.E. of Birmingham. It is a centre of the cotton trade, and has large manufs. of all kinds of ironwork and machinery. It was founded in 1872. Pop. 31,000.

Annihilationism, see CONDITIONAL IMMORTALITY.

Anniversary (Lat. *anniversarium*, from *annus*, year, and *vertere*, *versum*, to turn) is a term used to express the yearly return of any remarkable day. A.s of religious festivals, of great events in hist., and of birthdays in domestic life are kept. The Christians keep Christmas Day, Good Friday, Easter, and Whitsun in commemoration of the great events in the life of Christ. The sovereign's birthday is officially kept on 12 June. See CALENDAR.

Annonaceae, family of dicotyledonous plants consisting of tropical and sub-tropical trees and bushes. The flowers have a perianth in 3 whorls of 3, numerous hypogynous stamens, and numerous superior carpels, usually with many ovules. The genera include *Annona*, *Asimina*, *Artabotrys*, *Centabotrys*, *Gualteria*, *Uvaria*, and *Xylopia*.

Annonay, Fr. tn in the dept of Ardèche, on the Cance. It manufs. paper, textiles, and chemicals. Pop. 15,500.

Annotto, **Anatta**, **Anatto**, dyestuff from seeds of *Bixa orellana*, W. Indian evergreen tree.

Annual Register, pub. yearly, a record of contemporary events. It was started in 1758 by Dodsley the bookseller. It is now pub. by Messrs Longmans, and contains information on literature, art, science, and events of the current year.

Annals, strictly anything lasting for one year only, or repeated every year. The term usually refers to (1) ann. plants which flower for a year and then seed themselves, and (2) books of which successive numbers are pub. once a year. Very popular as gift books in the early 19th cent. were the ann. anthologies of prose and verse, sumptuously produced, and illustrated with steel engravings. The first one, *Forget Me Not*, appeared in 1823, followed by *Friendship's Offering* and *The Literary Souvenir*. *The Keepsake* and *The Book Of Beauty* continued till 1836. They often contained the first printings of the work of famous authors. In the latter part of the cent. Christmas A.

were issued by the publishers of fashionable magazines such as *Belgravia*. The *Saturday Book*, first pub. in 1941, is a return to the sumptuous gift book illustrated in colour, first ed. by Leonard Russell, and since 1954 by John Hadfield. Children's A. are issued by the publishers of most children's magazines, and contain stories, articles, puzzles, etc. See also YEAR BOOKS.

Annuity, term applied to a sum of money which is paid yearly, or at certain periods of each year. The most general application of the term is in the case of what are otherwise called *life A.s.*, that is, where a certain sum is paid *per annum* until the death of a stated person. *A.s.* certain are not dependent upon any contingency, and may be *terminable*, in which case the payments continue until a stated date, or *perpetual*, where the payments are presumably for ever. When the first payment has to be made at the time of the transaction, it is called an *A. due*, but when payment has not to commence until a stated date, it is called a *deferred A.*

The gov. uses the principle of terminable A.s. to discharge certain obligations within a given time, with a view to limiting in some degree the burdens placed on posterity by the national debt. Such A.s. may be held by private persons, and are exchanged either for cash or for gov. stock, which is cancelled when the A.s. are taken up. The gov. may also make an arrangement with itself, as it were, as a banking concern, to make payments to include a proportion of the cap. as well as the interest of gov. stock, as in the 'Old Sinking Fund.' The value of such an arrangement is that it can be varied upon an emergency, although, for obvious reasons, such a proceeding is usually avoided if possible. Instances of perpetual A.s. are provided by the various irredeemable gov. stocks, where the security is practically absolute. In calculating the present value of an A. certain, or the yearly amount for a certain purchase value, the interest reckoned is compound. Methods of calculation are to be found in any text-book of algebra. See also PUBLIC DEBT.

Life A.s. present some more complicated features than A.s. certain, because the probability of the contingency becoming actual enters into the calculation. Hence the importance of tables of mortality, etc., for insurance companies and others who deal with A.s. The tendency in early times was to use very simple rules for the probability of death, which were generally very inaccurate for extreme cases. Thus the rule in Rome up to AD 230 was to reckon for all ages under 30 an A. was worth 30 years' purchase, and for every additional year of age 1 year was taken off the purchase value. Thus the purchase value actually vanished at 60 years of age. In 1725 Abraham DeMoivre enunciated the rule that out of 86 children born one would die every year until the last one died between the ages of 85 and 86. This was found to fit in approximately with observed facts, but continual improvements

have since been made. Perhaps the same conclusion had been arrived at in 1671 by Huddle, in a correspondence with Jan de Witt, grand pensionary of Holland. In 1693, Halley, the famous astronomer, worked out the probability of death for every fifth year from the records of births and deaths in the city of Breslau, and computed the purchase value of A.s. at 6 per cent interest, this being probably the first attempt to arrive at values on a scientific basis. Shortly afterwards the Eng. Gov. attempted to raise money by the sale of A.s. at 14 per cent, that is to say, at about 7 years' purchase. Notwithstanding the pub. tables of Halley, which showed that such A.s. were worth from 17 years' purchase at age 10 to 44 years' purchase at age 75, the proposal was by no means eagerly accepted by the investing public. In 1808 the Northampton table was adopted by the gov., based on statistics of the deaths in Northampton between 1735 and 1780. A.s. were offered on the lives of nominees, this time based on age with no distinction of sex, but at much too favourable a rate. Again little business was done except by Dutchmen, who were more conversant with the subject and chose their lives carefully, but the loss on such transactions increased until it amounted to as much as £8000 a week. The next scheme was much more scientifically constructed, but included A.s. for men of 90 years of age at 62 per cent or less than 2 years' purchase. This provided an opportunity for speculators who nominated all the healthy old men they could lay their hands on and reaped a rich harvest. Thenceforward A.s. on aged lives were not offered, and some time afterwards it was enacted that no one could nominate a life over 65 unless the nominee had a direct interest in the A.

Naturally such experiences and the gradual accumulation of reliable statistics have enabled the gov. to ascertain what rates are profitable. The gov. tables, however, are based on the assumption of a 2½ per cent interest, whereas many insurance companies can afford to allow for at least 3½ or 4 per cent interest. The tables in general use by the priv. insurance offices are those prepared by the Institute of Actuaries, and are distinguished by the symbols *a(m)* and *a(f)* denoting select male lives and select female lives. See also ACTUARY and INSURANCE.

Examples of such tables are appended:

TABLE 1. *a(m)*

Showing the value of an A. of £1 at certain ages.

Age next Birth-day	Value of an A. of £1	Age next Birth-day	Value of an A. of £1
20	£19.552	50	£14.220
25	19.029	55	12.772
30	18.382	60	11.186
35	17.588	65	9.513
40	16.634	70	7.832
45	15.510	75	6.233

TABLE 2

Approximate A.s for a purchase price of £100

Age next Birth-day	A. for £100 Males	A. for £100 Females
40	£5 16 0	£5 11 0
45	6 4 0	5 16 0
50	6 14 0	6 4 0
55	7 9 0	6 14 0
60	8 9 0	7 9 0
65	9 18 0	8 11 0
70	11 18 0	10 1 0

Annulet, in architecture, a narrow stone ring round a column, much used in Romanesque and Gothic buildings; also beneath the capital of the Greek Doric Order.

Annulus, in geometry, the space enclosed between the circumferences of 2 concentric circles. Its area is the difference between the areas of the circles.

Annunciation, announcement to the Virgin Mary by the angel Gabriel of Christ's Incarnation. The Feast of the A. (commonly known in England as Lady Day) is kept throughout the Church on 25 Mar. The highest lit. order of knight-hood was that of the A. The subject has frequently been treated in sacred art.

Annunzio, Gabriele d' (1863-1938), Prince of Monte Nevoso, lt. poet, novelist, and dramatist, b. Pescara, educ. at the college of Prato, Tuscany, and at the univ. of Rome. He was the son of the Duchess Maria Gallese di Roma, of Dalmatian extraction. His first pub., *Primo vere* (verse), 1879, won him notice, and he was welcomed at Rome by the Cronaca Bizantina group. The *Terra Vergine*, 1882, was a continuation in prose. *Canto Nuovo* appeared the same year. As a journalist on the staff of the *Tribuna* at Rome he wrote under the name of Duca Minimo. Other earlier works are *Intermezzo di Rime*, 1883; *San Pantaleone* (collection of short stories), 1886; *Il libro d'Isotta*, 1886; *Odi Navali*, and *Poema Paradisiaco*, 1893; *Chimera*, 1895; *La Canzone di Garibaldi*, 1901; *Elegie romane*, 1905; *Laudi*, 1909; *L'Orazione e la Canzone in morte di Giosue Carducci*, 1907. Chief among his novels, which contain vivid descriptions, and show much beauty of style and psychological insight, may be mentioned *Il Piacere*, 1889 (trans. into English as *The Child of Pleasure*, 1898); *L'Innocente*, 1891; *Il Trionfo della morte*, 1896; *La Vergine delle Rocce*, 1897 (Eng. trans. 1899); *Il Fuoco*, 1899. Among his tragedies are *La Citta morta* (written for Sarah Bernhardt), 1898; *La Gioconda*, 1899; *La Gloria*, 1899; *Francesca da Rimini*, 1901; *Più che l'amore*, 1906; *Le Martyre de Saint Sébastien* (in French), 1911. A miscellany entitled *La Leda senza cigno* appeared in 1913. In 1914 he produced a play in French, *La Pisanella ou la mort morte parfumée*; also *Parisina*, for which Massenet composed music. In 1892 he had begun to read Nietzsche who exerted

a strong influence on his writings, as also Schopenhauer, Dostoyevsky, and Wagner. Many of his shorter stories were obviously suggested by the works of other writers, e.g. *The End of Candia* was clearly founded on Maupassant's *A Piece of String*; *San Pantaleone* reminds us of Verga's tale of the rival saints; and *Mastro Peppe's Magic* is a variation of a well-worn comic theme of old lt. novelists. Similarly, with many of his long novels, the theme, treatment, and even the phraseology may at times be traced to anterior writers. He is original, however, in his predilection for pathological and psychological abnormalities, as well as in his rhetoric; he employs words as a musician employs sounds, and expresses his individuality in swift vital language shot through with colour.

He was in France at the time the First World War broke out, and instantly made it his business to urge Italy to side with the Allies. *Per la più grande Italia*, addresses concerning the war, appeared in 1915. A. took a passionate interest in politics, and had surprised many by his performances on active service, the extreme sensuality of his literary work having led people to believe him a weakling. He had been in the artillery, and had lost an eye when practising aviation; but his most remarkable exploit came after the armistice of 1918 when he prevented the internationalisation of the port of Fiume. He pub. in 1921 *Notturmo*, dealing with the blindness he suffered after the aeroplane accident. In 1924 he was made Prince of Monte Nevoso, and there appeared the first vol. of *Le faville del Maglio*. In the spring of 1925 he was visited by Mussolini, who had become dictator of Italy. In 1927 the lt. Gov. commenced the pub. of his works in 48 vols.; the issue was completed in 1938, the year of A.'s death. A.'s influence in lt. literature cannot be exaggerated; he freed Italy from the intellectualism of the 19th cent., and transformed the language into a vehicle for the expression of sensuousness and poetic emotion. See A. Sodini, *Ariel armato* (biography), 1931; G. Griffin, *Gabriele d'Annunzio*, 1935; D. Pastorino, *Gabriele d'Annunzio*, 1941.

Annus Deliberandi, period allowed to an heir by Scots law to decide whether he will accept or reject the inheritance. This was formerly of importance, as acceptance rendered the heir liable for the whole of his ancestor's debts regardless of the value of the estate.

Anoa, species of ruminating quadruped (*A. depressicornis*), intermediate between the antelopes and the ox or bovine group. It is about the size of a sheep; is wild and fierce; and its horns are erect, straight, sharp, depressed anteriorly, and irregularly ranged at the base. It is found in large herds in the is. of Celebes.

Anobium, genus of coleopterous insects. It consists of small beetles which live on organic matter. *A. paniceum* is the biscuit weevil, and *A. striatum* the death-watch, which makes a curious tapping

sound by knocking the lower part of its head on the wood.

Anobon, see ANNABON.

Anode, in electrolysis (q.v.) and other electric phenomena, the electrode in connection with the positive pole of the battery. The direction of the conventional current is from the A. through the liquid to the cathode. In electric discharges and radio valves, the electron current is from cathode to anode. See CATHODE.

Anodynes, or **Analgesics**, medicines which relieve pain by their action on the brain, or their influence over the conductivity of the sensory nerve fibre. The prin. A. are opium, Indian hemp, belladonna, aconite, chloroform, antifebrin, antipyrine, etc. They should never be used except in accordance with the advice of a medical man.

Anointing, see BAPTISM; CHRISM; CORONATION; EXTREME UNCTION.

Anolis, genus of lizards belonging to the family Iguanidae, and peculiar to tropical America and the adjacent is. The structure of their toe pads enables them to traverse a smooth wall or ceiling, and to climb with great facility. They are slender, active, and for the most part of small size, and are mostly found in woods and rocky places. They are timid and harmless, and when under the influence of fear they dilate the dowlap, and the skin, especially of the throat, changes its hues with great rapidity.

Anomalistic Year, period of time, between 2 successive passages of the earth through its perihelion, the point in its orbit when it approaches nearest the sun. This point is not fixed, and as a result the A. Y. is over 4½ min. longer than the sidereal.

Anomaluridae, African rodent closely allied to the flying squirrels and having flight membranes, but forming a distinct genus (*Anomalurus*) by reason of the horny scales on the lower surface of the tail. These project from the skin and act as an 'antiskid' device when the animal lands from a leap.

Anomaly (Gk *an-*, negative; *homalos*, even), term used in astronomy to denote the position of a body—usually a planet or comet—in its orbit. There are 3 different kinds of A. The *true A.* is the angle between the line drawn from the sun to the position of the body in its orbit and the line from the sun to its perihelion: this angle is measured in the plane of the body's orbit and in the direction of its motion. The *mean A.* represents what the angular distance of the body from perihelion would be if it moved with uniform velocity in a circle whose radius is equal to the mean distance of the body from the sun, and is usually denoted by *M*. The *eccentric A.*, denoted by *E*, is connected with *M* by the relation $M = E - e \sin E$, where *e* is the eccentricity of the orbit of the body, and the *true A.* *v* is connected with *E* and *e* by the relation

$$\tan \frac{1}{2} v = \sqrt{\frac{1-e}{1+e}} \tan \frac{1}{2} E.$$

Anonymous (Gk *an-*, not; *onuma*, name),

description of a writing or work in which the author's name is not given. A. work is described as pseudonymous when an assumed name is given. Most of the works of art of antiquity which have come to us are A., and in past cents. many great writers have pub. their work in this form. Swift's *Tale of a Tub* is an example. The first ed. of Jane Austen's *Sense and Sensibility* was 'By a Lady,' while *Pride and Prejudice* was 'By the author of *Sense and Sensibility*.' Most journalistic essays were until comparatively recently pub. anonymously, as concealment was felt to give greater freedom to the writer. The work of reference in general use for discovering the authorship of A. books is Halkett and Laing's *Dictionary of Anonymous and Pseudonymous Literature*, 1926-34, to which a supplementary vol. was pub. in 1936 covering the years 1900-50. See also PSEUDONYM.

Anopheles (Gk *an-*, without; *phleleia*, benefit), genus of mosquitoes, of the order Diptera and family Culicidae. *A. maculipennis*, a common Brit. species, is one of the distributors of malaria in tropical countries. See ROSS, SIR RONALD.

Anorthite, mineral of the feldspar group, consisting of calcium and aluminum silicate. The colour is white, grey, or red, and its hardness about 6. A. is a constituent of igneous rocks such as some basalts and gabbros, but the most completely developed crystals are found in rocks ejected from Mt Vesuvius.

Anorthoclase (Gk *an-*, not; *orthos*, straight; *klasis*, fracture), feldspar similar to orthoclase, but with soda in place of some of the potash in its composition.

Anouilh, Jean (1910-), Fr. dramatist, b. Bordeaux. He was in turn copy-writer and secretary to Louis Jouvet. Since the great success of his *Voyageur sans Bagage* (1936), he has become one of the leading Fr. dramatists of his time. He divides his plays into *pièces noires*, tragical and pessimistic plays, including *L'Illermine*, 1932, *Jezebel*, 1932, *La Sauvage*, 1934, and *Roméo et Jeannette*, 1945; *pièces roses*, rooted in traditional Fr. comedy, including *Le Bal des Voleurs*, 1932, *Le Rendez-vous de Senlis*, 1937, and *Léocadia*, 1939; and *pièces brillantes*, including *L'Invitation au Château*, 1947, *Colombe*, 1951, and *La Valse des Toréadors*, 1952. Even in the *pièces roses*, however, the dark shadow of despair and bitterness is easily distinguishable. Many of A.'s plays are drawn from antiquity, as *Eurydice*, 1942, *Antigone*, 1942, *Médée*, 1946, and *Oreste*, 1947. There are Eng. and Ger. trans. of his most successful plays. See H. Gignoux, *Jean Anouilh*, 1946; J. Didier, *À la rencontre de Jean Anouilh*, 1946; E. G. Marsh, *Jean Anouilh*, 1953.

Anquetil Duperron, Abraham Hyacinthe (1731-1805), Fr. orientalist, b. Paris, brother of Louis Pierre A. He studied theology, and his slight acquaintance with oriental languages became a passion. He visited India and collected stores of knowledge and MSS. In 1771 on his return he pub. the first European

trans. of the *Zend-Avesta* (3 vols.). In 1801-2 he pub. a Lat. trans. from the Persian of the *Oupnek'hat* (*Upanishad*).

Ansars, or **Nossairians**, Arab tribe of N. Tripoli, whose mystic religion is a compound of Mohammedanism and ant. Syriac cults, with traces of Gnosticism. Its origin is lost in obscurity, but it probably dates from the 9th cent. See *Dussaud's Histoire et religion des Nasairis* (Paris), 1900, a standard work on the Alawis and Druses.

Ansbach, or **Anspach**, Ger. tn in the Land of Bavaria (q.v.), 92 m. NW. by W. of Munich (q.v.), on the Rezat. From 1460 to 1791 it was the seat of the margraves of A., and from 1791 to 1806 belonged to Prussia. It has a baroque castle, streets of fine baroque houses, and sev. notable churches, including the 15th-cent. pilgrims' church of the Holy Cross. The tn is a road and rail junction, and has manufs. of machinery and buttons. Pop. 35,000.

Anscharius, see **ANSGAR**, St.

Anschluss, movement of the political union of Austria and Germany, which first found concrete expression in 1931 in the Austro-Ger. Customs Union proposal and finally ended successfully in the forcible incorporation of Austria in the Third Reich, 1938-45. See **AUSTRIA**.

Ansdell, Richard (1815-85), landscape and animal painter, b. Liverpool, first exhibited at the Royal Academy in 1840. His travels in Spain led to various Sp. subjects. Among his paintings are 'Grouse Shooting' and 'A Galloway Farm' (both exhibited at the Royal Academy, 1840), 'Death of Sir William Lambton at Marston Moor, 1842, and 'Treading out the Corn,' 1865.

Anselm, St (1033-1109), b. Aosta in Piedmont. In 1056 he joined the Benedictine order at Bec, in Normandy, of which he afterwards became abbot. In 1093 he was summoned to succeed Blessed Lanfranc as Archbishop of Canterbury, and immediately had to contend with the encroachments of William Rufus upon ecclesiastical rights. Exiled by that monarch, he was recalled on the accession of Henry I, and soon found himself involved in a controversy with the king over the question of investiture. There followed a second exile, which was terminated in 1106 by the famous compromise, leaving temporal investiture to the king but reserving investiture with the emblems of spiritual jurisdiction to ecclesiastical authority. Of A.'s writings we possess his theological treatises *Monologion*, *Proslogion*, and *Cur Deus Homo*, and also a revelation of his personal sanctity in the *Meditations and Letters*. See *Opera Omnia Sancti Anselmi* (ed. F. S. Schmitt), 1948. A. was buried next to Lanfranc in Canterbury Cathedral. He was canonised in 1494 and declared a Doctor of the Church in 1720; his feast is on 21 April. See Endmer (A.'s chaplain), *Vita Anselmi* (ed. M. Rule), 1884; J. Clayton, *St Anselm: a Critical Biography*, 1933; Daniel-Rops, *Cathedral and Crusade* (Eng. trans.), 1957.

Anser (Lat., 'goose'), scientific name for

the genus of birds which contains the goose (q.v.). *A. cinereus* is the grey goose, *A. hyperboreus* the snow goose, *A. segetum* the bean goose.

Ansgar, **Ansharius**, or **Ansgarius**, St (801-65), 'the Apostle of the North,' was b. near Amiens, and d. Bremen. He went as a missionary first to Denmark, and then to Sweden. In 831 he was made Archbishop of Hamburg, and the see was transferred to Bremen in 847. Among his works are some essays and a *Life of St Willibrord*.

Anshan, Chinese industrial tn in Liaoning, situated half way between the cap., Shenyang (Mukden), and its port, Yinkow, to the SW. It produces most of China's iron and steel and is the supply centre of rails and seamless tubes for her heavy industry. Since 1949 its production has increased from 150,000 to 3 million tons, and the pop. has increased from 130,000 to 270,000 (1956).

Anson, **George**, Lord (1697-1762), famous admiral and circumnavigator of the world, b. Shugborough in Staffs. In 1712 he entered the navy, and by 1724 had reached the rank of captain. In 1740, during the war with Spain, he was made commodore of the S. Amer. squadron, and though the expedition was hopelessly mismanaged, his indomitable perseverance earned some success. See his *Voyage round the World*, 1748.

Anson, **Sir William Reynell** (1843-1914), jurist, b. Walberton, Sussex. In 1874 he became Vinerian reader in Eng. law at Oxford, and in 1899 was returned as Liberal-Unionist M.P. for the univ.; parl. secretary of the Board of Education, 1902. He pub. *Principles of the English Law of Contract*, 1884, and *Law and Custom of the Constitution*, 1886-92.

'**Anson**', battleship of the *King George V* (q.v.) class, laid down on the Tyne in 1937 and commissioned in 1942. Displacement 35,000 tons. Complement 1500 men. Length 739 ft 8 in., beam 103 ft, and draught 27 ft 8 in. Equipped with 4 aircraft, with enhanced defence against air attack. Armament 10 14-in. guns, 16 5.25-in. guns, and 4 multiple pom-poms. The 14-in. guns were a new model with an effective range greater than the 15-in. guns mounted on earlier ships.

Ansonia, city of New Haven co., Connecticut, U.S.A., on the R. Naugatuck. It produces brass, copper, hardware, clocks, electrical equipment, tools, machinery, textiles, and wire and sheet-metal products. Pop. 18,700.

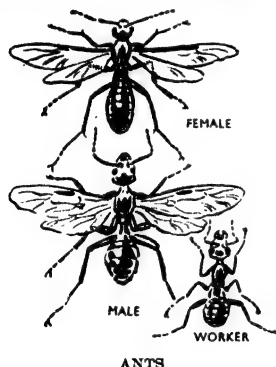
Anspach, see **ANSBACH**.

Anstey, Christopher (1724-1805), poet, b. Cambs. He was educ. at Bury St Edmunds, Eton, and King's College, Cambridge. His *chef-d'œuvre* was the *New Bath Guide*, a poem pub. in 1766. This satirical sketch of Bath life made a decided hit at the time, and is enthusiastically praised by both Gray and Walpole in their correspondence. None of his other works attains the same standard.

Anstey, F., pseudonym of **Thomas Anstey Guthrie** (1856-1934), novelist, b. London. Educ. at King's College School and Cambridge, he studied law and was

called to the Bar in 1881, but turned to writing after the success of his fantasy *Vice Versa*, 1882, the story of a man who exchanges bodies with his schoolboy son. From 1887 to 1930 he was on the staff of *Punch*. He is best remembered for his fairy-tale extravaganzas: *The Tinted Venus*, 1885, *A Fallen Idol*, 1886, *The Man from Blankley's*, 1893, *Baboo Jabberjee, R.A.*, 1897, and *The Brass Bottle*, 1900. His serious novels had little success. *A Long Retrospect*, 1936, is autobiographical.

Anstruther, tn on the Firth of Forth, Fifeshire, Scotland, since 1929 comprising the royal burghs of Kilrenny, A. Easter and A. Wester, which is the tn's full title. It is the hp. of the poet, Tennant and the great divine, Dr Chalmers. Fishing, oûskin manuf., and golf-club manuf. are the main industries. Pop. 3000.



Ant (O.E. *amete*; A.-S. *aemete*; Ger. *Ameise*, from Old High Ger. *meizan*, to cut), Emmet, or Pismire, insect of the family Formicidae (Lat. *formic*, ant) of the order Hymenoptera, to which also belong the wasp and the bee. They are social animals of many genera and about 3500 species; they vary greatly, not only among the various genera, but also among the individual species. The *white A.s* (termites) are often thought to belong to the A. family, but they are in reality members of the order Isoptera, and though in habit and construction of their homes they somewhat resemble A.s, they are not closely related morphologically.

A.s are omnivorous, feeding on both vegetable and animal life, when alive and when dead. The harvesting A.s (*Aphaenogaster*) store up grain for food, the leaf-cutting A.s (*Atta*) completely denude trees and store the leaves in their nests for the sake of a fungus which will grow on them; other A.s are cannibalistic. All delight in saccharine matter, and it is on this account that they keep their *cows* i.e. aphids, which excrete a sweet substance, seen on plants as *honey-dew*.

The queen A. is the greatest in size, and in her nest there will be males, females, and neuters, or aborted females.

Sometimes both male and female are winged, sometimes winged and wingless live together. Among neuters the *soldiers* have larger heads than the mere ordinary *workers*, and these defend their home when it is attacked. Both workers and fertile females have stings, and the poison they eject is known as *formic acid*. The male A. is usually smaller than the female. In the colony occasionally beetles and smaller A.s, as the *Formica rufa*, live peacefully, and are thought to take the place of domestic pets. Mating takes place between winged A.s when in flight; the male soon after perishes, and the females which escape such perils as drowning and insectivorous birds tear off their wings and perform their new role. They either go voluntarily to a nest to lay their eggs, or are dragged to one by workers, who will attend to the needs of the young. Occasionally the females found a new colony without the workers, performing all the work alone until the first brood is hatched; as this consists of workers, the female does not long pay attention to the eggs. The workers carry the eggs from one part of the nest to another as the temp. requires, the nest consisting of irregular cells connected by passages. The larvae are fed on semi-digested food by the workers, and when they grow older some species form cocoons; even in the pupa stage the workers feed them, and when the time is ripe for their entrance into the world, they help them to extricate themselves from their cases and lick them over when they are free. The so-called 'ants' eggs' often used for feeding goldfish are really the pupal stage of the A.; their food value is small. Some A.s, as the *F. sanguinea* and the genus *Polyergus*, make slaves of other A.s, and in some instances are unable all through life to feed themselves, actually depending on their slaves to put the food into their mouths. *F. sanguinea*, the blood-red robber A., occurs in Britain; the workers carry out special slave raids during which they attack workers of other species (chiefly *F. fusca*), and carry off the pupae.

Mention may also be made of the peculiar partnership existing between some common species of A.s and certain butterflies, reaching its highest level in butterflies of the family Lycaenidae. The caterpillars have on the seventh abdominal segment a gland secreting a sugary liquid which is licked up by A.s; the caterpillars benefit from the association since they are protected from their enemies (ichneumons) by the A.s. The caterpillars of the large blue butterfly are not only attended and 'milked' by A.s, but they are even taken by the A.s into their nests. Here the caterpillars become parasitic and prey on the A. larvae; if deprived of the larvae, they are unable to complete their development into the adult butterfly.

A.s are usually very short-lived. The queens may last for sev. years, but the ordinary A.s usually endure for only one summer; the workers survive in winter by hibernating. The intelligence of A.s

is a disputed subject, but they are known to show signs of excitement at the return of a strayed companion or on the approach of the queen, and they recognise members of their own species which have entered other nests. The workers of some species are almost sightless, but A.s have the power of vision generally. They communicate with each other seemingly by means of their antennae, and by stridulating organs of the abdomen. They take great care of the sanitation of their nests, removing the dead and all unnecessary objects immediately. The nests are frequently mounds of earth and leaves, but often are found beneath stones. An Australian A., the *Myrmecia*, builds enormous mounds, and a S. Amer. A. forms hills 5 or 6 ft. in height. See J. T. Moggridge, *Harvesting Ants*, 1873; F. White, *Ants and their Ways*, 1883; F. W. Frohawk, *Natural History of British Butterflies*, 1926; H. St. J. K. Donisthorpe, *British Ants*, 1927; Sir John Lubbock, *Ants, Bees, and Wasps* (ed. J. G. Myers), 1929; E. N. Marris, *The Soul of the White Ant*, 1937; Caryl P. Haskins, *Of Ants and Men*, 1946.

Ant-bear, the popular name of the *Myrmecophaga jubata*, is also known as the great ant-eater (see under ANT-EATERS).

Ant-eater, Scaly, see PANGOLIN.

Ant-eater, Spiny, see ECHIDNA.

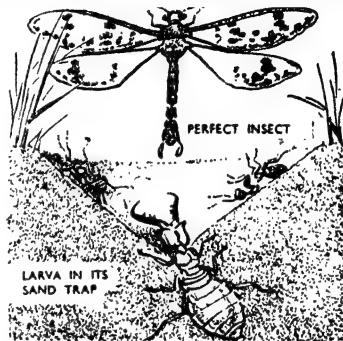


ANT-EATER

Ant-eaters, popular name for members of the mammals known as Myrmecophagidae, of the order Edentata, peculiar to central and S. America. It is toothless, its head being prolonged into a long snout containing a protrusible tongue always well moistened with saliva, with which it picks up the ants and termites on which it feeds. *Myrmecophaga tridactyla*, the great ant-eater, also known as the ant-bear or tamanoir, is about 4 ft. long, and the bushy tail, which serves as protection against cold, about 2½ ft. As it walks it bends its long and sharp claws beneath it, but it can use them in its defence. It produces a single offspring at a birth. *Tamandua* and *Cyclopes* are other genera, both arboreal.

Ant-lion, larva of the family Myr-

meleonidae, of the order Neuroptera. The eggs are laid in loose sand, and when the larva has appeared it forms a conical pit, at the bottom of which it hides, and seizes upon any small insect, such as an ant, which may fall into it. By means of its legs it throws sand on its victim to hasten its fall, and by means of its mandibles, which communicate with the alimentary canal, it holds it firmly and absorbs its juices, then throws away the body. The mature insect has 4 wings. It is unknown in England, but is found in various parts of Europe and America.



ANT-LION

Ant-thrush, or Ant-catcher, species of perching bird belonging to the family Formicariidae. As their name implies they feed largely on ants. These birds, which range in size from a jay to a wren, are found in central and S. America.

Antacids in medicine, substances which have the power of neutralising or counteracting acids in the gastric juices or excreta. The most important are caustic soda and potash, with their carbonates, bicarbonates, acetates, and citrates; ammonium and magnesium, with their preparations; bismuth subcarbonate. More recently aluminium hydroxide has been used as an antacid. Some of these, like soda and aluminium, act directly upon the gastric membrane; others, like the acetates and citrates, act indirectly through the blood, being converted into carbonates. The direct A. are used in dyspepsia, where it is required to counteract the excessive acidity of the stomach; and the indirect in gout, where the excess of uric acid in the blood is to be counteracted.

Antaeus, son of Poseidon and Gaia, Libyan giant invincible at wrestling until overcome by Hercules.

Antakya, see ANTIOCH.

Antalcidas, Spartan soldier and diplomatist, who succeeded in undermining the friendly relations between Athens and Persia, in the 4th cent. bc, and who later, by his naval operations in the Hellespont, forced Athens, in 386 bc, to accept the peace of A. By this treaty all Asia Minor was to be under Persian rule, and

all the Gk cities, except Lemnos, Imbros, and Scyros, became independent.

Antalkalia, substances which neutralise alkalis, such as acids.

Antalya, formerly *Adalia*, anct Attalia, seaport of Turkey on the Gulf of A. Built on the slope of a hill, the streets rise in tiers above one another, facing the harbour. It exports fruit, timber, and wheat. Its former importance as a port has been greatly lessened by the extension of railways and the unsuitability of its harbour for modern steamers. Pop. about 28,000.

Antar, Arabian warrior and poet of the 6th cent. A poem by him is one of the 7 to 10 called *Moallakāt* and he is the hero of a medieval romance, trans. into English by Terrick Hamilton, 1819. This romance gives a description of the manners and customs of the Bedouin Arabs.

Antarctic and Antarctica, circum-polar S. continent of roughly $5\frac{1}{2}$ million sq. m. It has as yet no permanent settlements, but divs. have been named: Alexander Land, Coats Land, Dronning Maud Land, Ellsworth Highland, Enderby Land, Graham Land, Kaiser Wilhelm II Land, Kemp Land, King Edward VII Land, King George V Land, MacRobertson Land, Marie Byrd Land, Oates Land, Princess Elizabeth Land, Queen Mary Land, Ross Sea Dependency, Terre Adélie, Victoria Land, Wilkes Land. The Brit. Commonwealth has claimed three-quarters of Antarctica, an area between 3 and 4 million sq. m. There are 5 main A. sectors: the Falkland Is. Dependencies, administered from the Brit. Colonial Office; the Ross Sea Dependency, governed by New Zealand; the vast prov. claimed by Australia in 1933, when Sir Douglas Mawson (q.v.) took possession of a large sector of Antarctica; Norway in 1939 annexed Dronning Maud Land stretching from the border of the Falkland Is. Dependencies in the W. to the border of the Australian A. Dependency in the E.—i.e. between 20° W. and 45° E.—together with the land within this coast and its territorial waters. The ter. is of great importance for the Norwegian whaling industry. The fifth sector (Marie Byrd Land and Ellsworth Highland) is yet unclaimed, since the Americans, who have mostly explored it, neither make nor recognise territorial claims in Antarctica. The continent is covered by a vast ice sheet from which huge tabular icebergs, sometimes miles in width, break off and float out to sea. In winter the sea freezes to form sea ice many feet thick. The depth of the A. Ocean varies considerably. From the neighbourhood of Tierra del Fuego to Kerguelen Is. it is about 2500 fathoms. Round the Pole at 60° S. it is over 2000 fathoms, while E. of Victoria Land it varies from 200 to 800 fathoms. Submarine ridges rise up at Graham Land to about 100 fathoms beneath the surface. Borchgrevink assigned to the magnetic pole the position of $73^{\circ} 20'$ S. and 146° E., but the local attractions of volcanic rocks and magnetic storms made his observations erroneous, and Profs.

Mawson, Mackay, and David have subsequently located it with more probability at $72^{\circ} 25'$ S. $155^{\circ} 16'$ W. on the inland ice some 7000 ft above sea level. Some mt ranges (e.g. Prince Charles Mts, Australian A. ter.) and isolated peaks (nunataks) pierce the land ice and sometimes reach 14,000 ft. Some parts are known to have copper and coal deposits; but the coastal lands are chiefly important for the whaling fisheries. There is a considerable pop. of animals either living in or dependent on the sea (penguins, sea-otters, whales, plankton, sharks, etc.), but only lichens exist on land. Most of Antarctica has been photographed from the air, but serious mapping, with ground control, has only been accomplished (since 1943) by the Falkland Is. Dependencies Survey.

Some day a delicate task may await the International Court at The Hague or elsewhere in adjudicating on the claims to the S. Polar continent which in recent years have been pressed with increasing insistence. Commander Byrd, for example, set out in Jan. 1940 from New Zealand for Antarctica, among his aims being the consolidation of the work of previous Amer. explorers with a view to making formal territorial claims to some 650,000 sq. m. of Antarctica. Until lately previous exploration has been the commonly accepted principle. Thus Norway, in making large claims in 1939, took care to avoid inclusion of parts discovered by Britain in the W. or by Australia in the E., just as Australia, in delimiting the regions charted by Sir Douglas Mawson, left a gap where the name of Terre Adélie (Fr.) bears witness to the exploration of D'Urville in 1840. An added difficulty subsequently arose from a new type of claim. Both in the Arctic and in the A. it has been suggested that nations whose shores border on the oceans in question should draw lines from their E. and W. extremities to the Poles and claim all in between. On this basis Argentina would gain a S. Polar section that would strike straight across regions charted by Great Britain and the U.S.A. But a final element of confusion is added to the whole question because, if it were referred to the judgment of the International Court of Justice, that court would be bound to find that till now international law has taken no account of any claim to ter. that was not backed by permanent settlement, and that as no country has yet found it worth while to keep a permanent pop. in that inhospitable land all claims alike are spurious. Settlement of the case U.K. v. Chile and Argentina, over claims to the Falkland Is. Dependencies, was attempted by the U.K. at The Hague in 1956. The case was removed from the list, since neither Argentina nor Chile recognised the court's jurisdiction. The activity of many nations during the International Geophysical Year (1957-8) in setting up bases for simultaneous scientific observations, and especially the new Soviet interest, after more than 100 years' lapse since Bellingshausen's voyage (q.v.), will most

probably lead to further claims and counter-claims. See *Polar Record*, 1931-; E. W. H. Christie, *The Antarctic Problem*, 1951; F. A. Simpson (ed.), *The Antarctic To-day*, New Zealand, 1952.

Antarctic Exploration. The hist. of A. E. may be said to begin with Capt. James Cook's voyages in the *Resolution* and *Adventure*, 1772-5, though Bouvet, Dalrymple, and others had done something to dispel the illusion of a S. Atlantic continent stretching to tropical lat.

It is impossible here to describe in any detail the voyages before 1874, but Ross in H.M.S. *Erebus* and H.M.S. *Terror* discovered and explored Victoria Land (1839-43), naming numerous is. and capes. The *Challenger* in 1874, commanded by Nares, was the first steamer to cross the A. circle, but though Nares went only to 66° S. southward of Kerguelen Is. the marine flora he collected and his recorded soundings and other information enabled Sir John Murray to draw numerous valuable inferences as to the existence and trend of an A. continent. The circle was not again crossed until 1893, when Evensen in the *Hertha* sighted Alexander Land, reaching 69° 10' S. 76° 12' W. In 1894 Christensen reached 74° S. at Coulman Is., finding that the sea was easily navigable to the S. Landing near Cape Adare, his party were the first people to set foot on what is generally believed to be the A. continent. In 1898 funds were raised to organise the expedition of the *Belgica*, which in Jan. of that year left Staten Is. for the A. The geographical results were poor so far as land discovery or penetration towards the Pole was concerned, but soundings estab. the existence of a continental shelf of great breadth connected with land to the S. In 1900 Borchgrevink (q.v.) with his party of the *Southern Cross* landed on Possession Is. and on the mainland at the base of Mt Melbourne. With the aid of sledges and dogs he advanced S. to 78° 50'. The next year the *Discovery*, equipped under the supervision of Sir Clements Markham, under the command of Commander R. F. Scott, R.N., left Cowes with Lt. (later Sir Ernest) Shackleton, Dr Wilson, and others on board. The expedition during 1901-4 discovered King Edward VII Land, a vast stretch of the austral continent reaching from 152° to 157° E.; and ascended the glacial sheet ice of Victoria Land, touching, after a 300-m. journey, an altitude of over 9000 ft in 77° 39' S. 146° E. The work of this expedition, together with the contemporaneous voyages of Nordenskjöld, who explored Palmer Land, and of the Ger. expedition under Drygalski, and the somewhat later journey of Dr Charcot in 1904 to W. Palmer Land, confirmed the theory of the existence of an A. continent which, until Bruce discovered Coats Land in 74° S. 24° W., directly opposite S. Victoria Land, had begun to be disbelieved. In 1908-9 Sir Ernest Shackleton carried out the brilliant scientific, geodetic, and geographical discoveries which earned for him his knighthood. He travelled nearly 2000 m., and ascertained the nature and

extent of the Great Barrier and reached a glacier-capped plateau of 11,000 ft elevation in 88° 23' S. 162° W., approaching within 100 m. of the Pole. The next year Capt. Scott set out on his tragic second journey to the Pole. In the meantime Amundsen, the celebrated N. Pole explorer, reached the Pole on 16 Dec. 1911. Scott also reached the Pole, only to find when he did so that Amundsen had preceded him (see SCOTT, ROBERT FALCON). In Jan. 1913 Lt. Filchner, in command of a Ger. expedition, reported the discovery of Prinz Luitpoldland and Kaiser Wilhelm II Land. Prof. (now Sir Douglas) Mawson set out in the *Aurora* in 1911 with Dr Mertz to gain additional knowledge of those lands which lie close along the arc of the A. circle due S. of Australia between S. Victoria Land and Kaiser Wilhelm II Land (where the *Gauss* Ger. expedition had its winter quarters in 1902-3), a tract which had scarcely been touched since the voyages of Balleny, Wilkes, and D'Urville. Sir Douglas Mawson has done much to delineate the A. plateau from the N., and the installation nearly 40 years ago of 2 wireless stations in communication with the Gov. Meteorological Office of Australia, on lands never before sighted, proved of great value as a means of warning ships and agriculturists and others, especially in Australia, of the approach of blizzards and storms.

No explorer has yet crossed the A. continent. Shackleton in 1914 proposed to make the attempt, as did Bruce in 1908, but the expense involved in such an expedition was prohibitive. At the end of 1928 Commander Byrd set out at the head of an Amer. expedition for a comprehensive exploration of the A. continent, and after establishing a base in the Bay of Whales made aeroplane flights. He took photographs during his flight over the S. Pole and obtained much new scientific information on meteorology, geology, etc. Meanwhile the Brit. 'Discovery Committee' (q.v.) organised whaling research expeditions in these waters, both in the wooden ship *Discovery* and in the new steel ship *Discovery II*, the main object of these expeditions being the utilitarian one of checking the threatened disappearance of the whale as a commercial asset by supplementing our existing knowledge of its migrations and breeding. At the end of 1928 Sir Hubert Wilkins, using *Deception* Is. as a base, flew over Graham Land, proving that it was not part of the main mass of the A. continent. In 1934 Adm. Byrd claimed to have discovered extensions of Little America which he named Marie Byrd Land and described as giving evidence of important coal deposits some 200 m. from the S. Pole. Lincoln Ellsworth, the Amer. explorer, with a Brit. pilot, Herbert Hollick-Kenyon, left New Zealand towards the end of Nov. 1935 for a research flight, reaching Little America by sledge, after which their wireless sets failed and nothing further was heard of them till mid Jan., when they were rescued by the R.R.S. *Discovery II*. They had flown some 2000 m.

to Adm. Byrd's base on the Ross Sea before being forced down. In the same year Norwegian explorers are said to have found new land between 80-45° E. long. and 67-50° S. lat. and 73° E. long. and 69-10° S. lat. in the Enderby quadrant, which they named Ingrid Christens Land. Early in 1937 Lars Christensen, the Norwegian explorer, accompanied by M. Wideroe, as pilot, reported the discovery



E.N.A.

THE BARNE GLACIER, VICTORIA LAND

A photograph by Herbert Ponting, taken during Scott's last expedition to the Antarctic.

of a range of mts between the 35th and 40th deg. of long., the highest peak of which was 4500 ft. They dropped the Norwegian flag at a point 38° E. and 69-30° S. New mountainous country with peaks rising to 10,000 ft was seen running from 26° E. and 71-30° S. for some 200 m. westward. Between 1935 and 1937 the *Discovery II* circumnavigated the A. continent, covering a distance of 50,000 m., investigating the distribution of whales in the whole region, besides taking observations of the hydrology and biology of the Ross Sea. The prin. geographical feature discovered by the Brit. Graham Land expedition under Mr John Rymill, which left London in 1934, has been named King

George V Sound. This sound separates Graham Land from Alexander I Land and at its mouth is 15 m. wide, extending some 250 m. in a southerly direction before turning W.

There were sev. A. expeditions during and following the Second World War, the largest being from the U.S.A. Brit. explorers and scientists of the Falkland Is. Dependencies Survey commenced in 1944 a systematic survey of all aspects of their sector and research into human adaptation to low temps. The Brit.-Scandinavian Antarctic Expedition estab. a base at Maudheim in Dronning Maud Land. In 1956 Brit. expeditions estab. themselves on the shores of the Weddell Sea in preparation for the A. observations to be made in the International Geophysical Year, 1957-8, when Brit., Amer., Russian, Fr., Norwegian, Jap., and Argentinian expeditions plan to work in the A. and the first crossing of the continent is to be attempted by Brit. Commonwealth parties. See also ANTARCTIC.

See James Cook, *A Voyage towards the South Pole and Round the World*, 1777; J. Weddell, *Voyage towards the South Pole*, 1825; D. D'Urville, *Voyage au Pôle sud* (29 vols.), Paris, 1841-5; J. C. Ross, *A Voyage of Discovery and Research in the Southern and Antarctic Regions*, 1847; C. E. Borchgrevink, *First on the Antarctic Continent*, 1901; L. Bernacchi, *To the South Polar Regions*, 1901; R. F. Scott, *Voyage of the 'Discovery'* (2 vols.), 1905; Sir E. H. Shackleton, *The Heart of the Antarctic* (2 vols.), 1909; Sir D. Mawson, *The Home of the Blizzard*, 1915; C. R. Markham, *The Lands of Silence*, 1921; A. W. Greely, *The Polar Regions in the Twentieth Century*, 1929; C. E. Laserson, *South with Mawson*, 1948; Lord Mountevans, *The Desolate Antarctic*, 1950; E. W. H. Christie, *The Antarctic Problem*, 1951.

Antares, name of a bright star, Alpha Scorpionis, which is about 330 light-years distant. Its diameter is 430 times that of the sun but its mass is only 25 times the sun's mass, and hence its density must be extremely small. It has given its name to the 'Antarian' type, i.e. those stars whose spectra contain a number of dark bands, sharp on the violet end and fading off at the red end.

Antecedent: 1. In grammar, the substantive to which a relative refers.

2. In logic, (a) the first of 2 propositions in an enthymeme, or syllogism in which one premise is suppressed. The second proposition is called the 'consequent.' Thus in 'Every man is mortal; therefore every king is mortal,' 'Every man is mortal' is the A., and 'every king is mortal' is the consequent; (b) the conditional part of a conditional or hypothetical proposition, e.g. in 'If luxury prevails, kingdoms must decay,' 'If luxury prevails' is the A.

3. In mathematics, the first of the 2 terms of a ratio. Thus in the proportion 2 : 4 :: 8 : 16, 2 and 8 are A.s, and 4 and 16 are consequents.

Antediluvian (Lat. *ante*, before; *diluvium*, flood), word used in speaking of

anything which is supposed to have existed or happened before the Flood. In palaeontology it is not used with the biblical significance, as science does not recognise a universal flood, but with the sense of having existed before the transformation of the earth by water. In this connection, however, it is to be noted that recent excavators at Ur and Kish, in Mesopotamia, have found proofs of a flood having occurred there and that the inhab. after it differed from those that preceded it. The 10 A. patriarchs were Adam, Seth, Enos, Cainan, Mahalaleel, Jared, Enoch, Methuselah, Lamech, and Noah. The term is now used generally in irony to describe anything of great antiquity.

Antefixa (Lat. *ante*, before; *fixae*, fixed), blocks with vertical fronts placed along the top of a cornice in classical buildings to hide the ends of the joint tiles. They were usually ornamented with a flower, leaf, head, or group of figures. The word was also applied to small projecting ornaments on friezes.

Antelope, name applied to many bovids of the order Artiodactyla. It is most properly used in speaking of the *Antelope*, or Indian black-buck, but it is often used in connection with the *Antilocapra*, N. Amer. prongbuck, or prong-horned A., which constitutes in itself the family Antilocapridae and is the sole species. A.s are, however, confined to the family Bovidae, which do not shed their hollow horns; the Antilocapridae, however, shed their horns, which are branched. Among the Bovidae are included sheep, goats, and oxen, and the A.s may almost be regarded as any of the animals which cannot be considered as any of these. They are found in immense numbers in S. Africa, and also in other continents, but are totally absent in Australia; in many cases reckless hunting has practically exterminated genera which were extremely numerous. They are graceful creatures living in the plains (exceptionally on mountains, e.g. chamois), have rounded or lyrate horns present in all males, though not in all females, and generally there is a curious tear gland filled with waxy matter beneath the eyes. They are dependent on their swift flight for their safety, as their horns provide small means of defence.

Among the numerous animals grouped under the term A. are the gnus, elands, hartebeests, addax, klipspringers, chamois, gazelles, chirus (serows), pallas, saigas, nilgais, and koodoos; the blesboks, duikerboks, black-bucks, springboks, water-bucks, bonteboks, reedboks, gemsboks, steinboks, grysboks, bushbucks; the royal, sable, roan, equine, Baker's, and harnessed A.s.

The royal A., or *Neotragus*, includes only one species, and the females are hornless; it is about the size of a hare. The sable, roan, equine, and Baker's A.s belong to the genus *Hippotragus* (with the extinct blaubok), and greatly resemble the addax; they are large animals, and both males and females carry long horns. The harnessed A.s constitute the genus

Tragelaphus, to which the bushbucks belong; they are the largest of the A.s, usually only the males have horns, their faces are marked and their beautiful bodies are striped as if they bore harness. For characteristics of the gnus, eland, etc., see under their respective headings. Consult P. L. Selater and O. Thomas, *The Book of Antelopes*, 1894-1900.

Antenna, see AERIAL.

Antennae (Lat. *antenna*, a sail-yard), popularly known as *horns* or *feelers*, are the anterior appendages on the heads of some arthropods, namely the crustaceans, insects, and myriapods. In insects there are always 2, but crabs and lobsters have 4 or more. They vary greatly in length, form, and comparative thickness, and may have over 100 joints; they form tubes carrying auditory, sensory, and olfactory nerves.

Antenor: 1. Athenian sculptor of the 6th cent. BC. He made the bronze figures of Harmodius and Aristogiton, which were carried away to Persia by Xerxes in 480 BC. They were restored to Athens by Alexander the Great. Two bases signed by him have been found in the Acropolis.

2. The wise Trojan who advised that Helen should be sent back to her husband, and advocated peace. There are legends that he betrayed Troy to the Greeks, and founded another city on its site, or migrated to Cyrene, or founded Patavium.

Antequera, Sp. tn in the prov. of Málaga, with a Moorish castle and sev. old churches. There are textile mills, iron foundries, and a trade in agric. produce and oil. Pop. 41,900.

Anthelion, phenomenon observed by a person whose shadow is cast upon a moist surface, such as a cloud, fog, or dewy grass; around the shadow are sev. concentric rings, luminous and coloured, shading into white at the edge. Also known as Broken Spectre.

Anthelmintics, medicines which destroy or cause the expulsion of worms, as santonin for the round worm; koussou, kamala, male fern, turpentine, arca nut, and pomegranate for the tape and broad worms; injections of salt, tannin, quassia, alum, iron, etc., for the thread-worm; and thymol for *Ankylostoma duodenale*.

Anthemion (from Gk *anthos*, a flower), conventional ornament derived from the flower of the acanthus (q.v.), resembling honeysuckle, and carved on Greek *antefixae* (q.v.) and cornices.

Anthemis, genus of the Compositae, of which the Brit. species are known as camomile (q.v.), they possess medicinal properties. *A. arvensis*, *A. cotula* (mayweed), and *A. nobilis* grow in fields and on commons. *A. tinctoria* is used in France for a yellow dye.

Anthemius (6th cent. AD), Gk mathematician and architect, b. Tralles in Lydia. He began the rebuilding of St Sophia in Constantinople for the Emperor Justinian, the church having been destroyed by fire in 531; it was completed by Isidorus of Miletus in 537. He wrote sev. mathematical treatises.

Anthems, type of sacred music of the Anglican Church, for voices, sometimes with solo parts and usually accompanied by the organ. Not being part of the liturgy, yet designed for performance during a service, they are in that respect the counterpart of the motet in the Catholic Church. Two types are known: the full A., which are exclusively choral, and the verse A., which contain passages or even complete pieces for a solo voice. Byrd, Gibbons, and other Elizabethans wrote great A., and those by Purcell stand out magnificently in the Restoration period, but can no longer be performed in church, being orchestrally accompanied. Later anthem-writers include Clarke, Croft, Greene, and Boyce, and in more modern times, Stanford.

Anthems, National, see NATIONAL.

Anther, pollen-bearing body at the tip of the filament of a stamen. It is united to the filament by means of a *connective*; and A., filament, and connective form the stamen. The A. consists of 2 A.-lobes, sometimes of 1, each containing 2, sometimes many, pollen-sacs, which burst open when ripe to free the pollen. It is said to be *versatile* if it swings on the filament (as in grasses), *dorsifixed* or *basifixed* if immovable. In some plants, e.g. daisy and potato, the A.s cohere, while the filaments are free; this is called the *syngenesious* or *syanththerous* condition.

Anthocyanin, in botany, name of a complex group of pigments which, in the main, give to red and blue flowers, etc., their peculiar colours. The red colour of roses, poppies, and geranium flowers, as well as of the roots of beets and radishes, is due to A. Similarly, the blue colour of violet, larkspur, and cineraria flowers, as also of the fruits of grape-vines and bilberry bushes, is due to A. Again, it is due to the development of a red A. pigment that many leaves derive their autumnal redness. The different colours of flowers and of fruits are due to the varying colour of the cell-sap and also to the different distribution of the cells containing the coloured cell-sap, also to the different combinations of dissolved colouring matter with the yellow, orange, or red chromoplasts and the green chloroplasts. Like litmus, some A.s are blue or violet in an alkaline solution and red or reddish in an acid solution. Under certain conditions they are also dark red, dark blue, and even blackish blue. Alkalis, too, frequently change the colour to green. Willstätter's researches have extended our knowledge of the chemical constitution of A.s. They are glucosides, i.e. compounds of glucose with other substances known as anthocyanidins, into which they can be decomposed by boiling with acids (hydrolysis). Thus cyanin, the blue colouring matter of the cornflower and the first A. to be studied by Willstätter, yields on hydrolysis 2 molecules of glucose and cyanidin. The other fundamental anthocyanidins besides cyanidin itself are pelargonidin (in the geranium) and delphinidin (in the larkspur). A large number of

compounds of glucose with these 3 parent substances cyanidin, pelargonidin, and delphinidin are possible, giving a wide range of colours in different flowers. The anthocyanidins are closely related to flavones, yellow pigments of wide occurrence in plants. Blood-coloured leaves, such as those of the copper beech, owe their characteristic appearance to the combined presence of green chlorophyll and A.; when such leaves are boiled in water the A. is dissolved, leaving chlorophyll, so that the leaves turn green in colour. See M. Wheldale, *Anthocyanin Pigments of Plants*, 1916, and L. T. Hogben, *Pigmentary Effector System*, 1924.

Anthology, compound Gk word, used metaphorically, which means literally a 'collection of flowers.' This title is applied to a work which is a collection of select extracts or choice passages from various branches of literature, but more generally the term is restricted to collections of short or lyrical poems. Most countries have their poetic A.s. Asiatic literature being extremely rich in them. To Confucius is attributed the compilation of the Chinese *Shi-King* (Book of Songs), and it is claimed for it that it is the oldest A. in the world. Rückert pub. a Ger. trans. of it in 1833, and his countryman, Von Hammer-Purgstall, rendered in 1818 a similar service by introducing Persian literature to the W. By far the most important A. is the Gk A. The first collection of Gk poems, called the *Stephanos* (Garland), was made by Meleager, a Syrian b. at Gadara at an uncertain date, but probably about the end of the 2nd cent. BC. It included poems by 46 poets, among them being Sappho, and, as is not an uncommon thing in A.s—their compilers being but human—a few poems by the editor. This work was added to by succeeding editors, whose MSS. have been lost, the earliest and fullest of the extant versions being that of Constantinus Cephalas, a grammarian who fl. in the middle of the 10th cent. AD. It contained excerpts from more than 300 poets, and the poems ranged from the 7th cent. BC to the 10th cent. AD. Early in the 14th cent. Maximus Planudes clumsily revised this beautiful collection of Cephalas, abridging, rearranging, and even altering. For 300 years his was the only Gk A. known, but in 1606 Salmasius rediscovered the A. of Cephalas in the library of the counts palatine at Heidelberg, whence it is called the Palatine A. There was no A. among the anc. Romans, and it was not until 1573 that Scaliger pub. in Leyden an imitation of the Gk A. under the title *Catlecta Veterum Poetarum*. Other editors of Lat. A.s are Pitthöus (Paris, 1590) and Peter Burmann (Amsterdam, 1759 and 1773). That of Riese (1870) contained nearly 1000 poems.

Among the earliest Eng. A.s were *Tottel's Miscellany*, 1559, *England's Parnassus*, 1600, and *England's Helicon*, 1602. Eng. verse from the Elizabethan poets down to Wordsworth has been collected in F. T. Palgrave's *Golden Treasury*. By many this is regarded as the standard

Eng. A., and undoubtedly as a pioneer in this field it may be said to have influenced its successors. *The Oxford Book of English Verse* was ed. by Sir A. T. Quiller-Couch, who profited by the mistakes of his predecessor, and in it are included many beautiful numbers the omission of which by Palgrave is difficult to account for. Such omissions included Coleridge's *Kubla Khan* and Keats's *Ode on a Grecian Urn*. The range of the *Oxford Book* is from 1250 down to 1918 in strict chronological order of birth. The total number of poems is 967. Other modern Brit. A.s are Allan Ramsay, *Tea-Table Miscellany*, 1724-40; Percy's *Reliques of Ancient English Poetry*, 1765; Thomas Campbell, *Specimens of British Poets*, 1841; T. H. Ward, *English Poets*, 1883; F. Locker Lampson, *Lyra Elegantiarum*, 1867 (rev. 1891); W. B. Yeats, *A Book of Irish Verse*, 1895 (revised 1900 as *Modern Irish Poetry*); Sir A. T. Quiller-Couch, *The Oxford Book of Victorian Verse*, 1912; *Poems of To-day*, of the Eng. Association (4 series, 1915, 1922, 1938, 1951); Robert Bridges, *The Spirit of Man*, 1916; Sir A. Methuen, *An Anthology of Modern Verse*, 1921; Sir Henry Newbolt, *An English Anthology of Prose and Poetry*, 1921; T. Caldwell, *The Golden Book of Modern English Poetry*, 1922; Sir A. C. Quiller-Couch, *The Oxford Book of English Prose*, 1925; Grace Rhys, *A Celtic Anthology*, 1927; G. Bullett, *The English Galaxy of Shorter Poems*, 1933; M. Roberts, *The Faber Book of Modern Verse*, 1936; W. B. Yeats, *The Oxford Book of Modern Verse*, 1936; G. Lacey May, *English Religious Verse*, 1937; W. H. Auden, *Oxford Book of Light Verse*, 1938; Lord David Cecil, *The Oxford Book of Christian Verse*, 1940; Edith Sitwell, *Anthology* (verse from Chaucer to Hardy), 1940; Hugh Macdiarmid, *The Golden Treasury of Scottish Poetry*, 1941; C. Day Lewis and L. A. G. Strong, *A New Anthology of Modern Verse, 1920-1940*, 1941; R. Church and M. M. Bozman, *Poems of Our Time*, 1945; M. Lindsay, *Modern Scottish Poetry*, 1946; D. Young, *Scottish Verse, 1851-1951*, 1952; C. Day Lewis and J. Lehmann, *The Chato Book of Modern Poetry*, 1956; while among Amer. A.s should be mentioned E. C. Stedman, *American Anthology* (1787-1899), 1900; Bliss Carman, *The Oxford Book of American Verse*, 1927; Louis Untermeyer, *American Poetry from the Beginning to Whitman*, 1931; H. H. Clark, *Major American Poets*, 1936; F. O. Matthiessen, *The Oxford Book of American Verse* (a new collection), 1950.

Anthron, Charles (1797-1867), Amer. classical scholar, b. New York. He was called to the Bar in 1819, appointed adjunct prof. of anc. languages in Columbia College in 1820, and prin. prof. in 1835. He ed. Lemprière's *Classical Dictionary* in 1841 and compiled a *Dictionary of Greek and Roman Antiquities* in 1843.

Anthony, St. see ANTONY, ST.

Anthony, Susan Brownell (1820-1906), Amer. reformer, b. Adams, Massachusetts, of Quaker parents, and taught in a New York school from 1835 to 1850. She was

a zealous agitator for total abstinence and the abolition of slavery, and, after the Civil war of 1861-5, for female suffrage. In 1868 she founded the *Revolution*; she was one of the authors of a *History of Woman Suffrage*, 1881-7. See her life by Ida Harper, 1898.

Anthophyllite (Gk *anthos*, flower; *phylon*, leaf), mineral belonging to the Amphiboles (q.v.), containing silicate of magnesium and of iron. It is of a brownish-yellow colour, has a pearly lustre, and its structure is fibrous. It is metamorphic.

Anthospermum Aethiopicum, or amber tree, is a small S. African evergreen shrub, of a genus of Rubiaceae, allied to coffee, needing a heated greenhouse in Britain.

Anthoxanthum, genus of grasses (Gramineae) of which the species *A. odoratum* is known to farmers as sweet vernal grass. It has pale yellowish-green flowers and only 2 stamens; the stems contain coumarin, which causes the fragrance of new-mown hay.

Anthozoa (Gk *anthos*, flower; *zōon*, animal), class of Coelenterata which includes corals, madrepores, and sea-anemones. All inhabit the sea, usually in the warm climates. They are synonymous with the Actinozoa.

Anthracene (C₁₄H₁₀), substance prepared from coal-tar. The coal-tar is subjected to fractional distillation; the fraction up to 170° consists of crude naphtha, from 170° to 230° carbolic oil is separated, from 230° to 270° creosote oil is separated, and above 270° the distillate is A. oil, whilst the residue in the still is pitch. The crude A. oil is cooled, the crystalline A. paste being filtered to obtain 40 per cent A. *a* or *b*, depending on the paraffin content. This is purified by treatment with high boiling-point pyridine bases to give 90-2 per cent A. which is then sublimed to obtain 94-5 per cent A.

A. is a crystalline solid, melting at 213° C. and boiling at 351°. It is only slightly soluble in alcohol and ether, but is easily soluble in benzene. Its commercial importance arises from the fact that it is the basis of the manuf. of many important dyestuffs, the 94-5 per cent A. being used.

Anthracite, or stone coal, a particularly hard and lustrous variety of coal, slow in ignition, but giving out an intense heat with little effusion of smoke. It is used for drying hops and malt; in blast furnaces where a high temp. is required; and for steam navigation purposes. It has been suggested that A. has been produced from vegetable matter that has been more completely macerated and deprived of its putrescible constituents before submergence than that producing ordinary bituminous coal, or that the submergence took place in shallow water where the plant substance was exposed to the oxidising influence of the air, thus minimising the amount of hydrogen and carbon compounds. Most A.s contain 90 per cent carbon, whilst bituminous and gas coals contain from 75 to 80 per cent of carbon, the remainder being made up of

hydrogen, oxygen, and nitrogen together with varying amounts of ash.

A. is found in large quantities in Pennsylvania and in S. Wales, where more than half of the supply is exported for use on steamers in all parts of the world.

Anthracotheres, large primitive pig-like artiodactyl mammals which are common in the middle Tertiary rocks of Europe and Asia. *Anthracotherium* was a typical member.

Anthraquinone ($C_{14}H_8O_2$), organic substance derived from anthracene by oxidation with chromic acid. It is manuf. on the large scale by oxidising 94-5 per cent anthracene produced in the distillation of coal-tar with sodium bichromate and sulphuric acid. The dried filtrate is heated at 100° with concentrated sulphuric acid, by which means the impurities are converted into soluble sulphates, so that the pure A. may be separated out. Another equally important manufacturing process is that from the condensation of phthalic anhydride and benzene.

A. crystallises in light yellow needles, melts at 286° , and sublimes at higher temps. in sulphur-yellow prisms. It is insoluble in water, but soluble in acetic acid and to a lesser extent in benzene and other organic solvents. Its commercial importance lies in the fact that it is an important intermediate for the manuf. of many vat, acid, and disperse dyes. The elucidation of its structure by Zincke and Pittig paved the way for the synthesis of alizarin and other important compounds. See also DYE.

Anthrax, acute, infectious disease, common to animals and man, caused by the *Bacillus anthracis*. It is also known as splenic fever, from the enlargement of that organ which invariably accompanies all types of A.

The disease is widely distributed as it affects animals, but appears to be particularly associated with marshy districts. There are 2 forms, external and internal. External A. is accompanied by malignant pustules in all parts of the body, accompanied by fever. They rapidly attain a great size, and general infection takes place, causing death within a few hours. Internal A. exhibits no reliable premonitory symptoms in animals; the first indication may be sudden death or staggering followed by convulsions. If death does not take place at once, ultimate recovery is possible. The only protective measure is inoculation with A. serum.

A. in man may also be external or internal. In external A. a small papule appears at the point of infection, which is usually a small wound on an exposed part. The papule increases in size, then breaks, leaving a dark blue or black scab. The scab gradually extends, may be cast off if recovery occurs, but is accompanied by general disturbances comprising fever and prostration leading to ultimate collapse in unfavourable cases.

Internal A. is usually due to infected drinking-water or diseased meat. Indefinite symptoms, such as headache and

languor, are followed by gastro-intestinal disturbances with bloody diarrhoea. Convulsions or spasms are followed by collapse. Certain cases of A. are traceable to particular occupations, such as woolsorters' disease, occurring among operatives in factories in which imported wool or hair, mostly from Russia and S. America, is sorted; and rag-pickers' disease, occurring among the rag-sorters in paper-mills near Graz. These latter forms affect the respiratory tract, causing septicaemic broncho-pneumonia, which is usually fatal.

Where cases of A. have occurred in animals, the hair, hides, wool, and bodies should be burnt. Disinfection of the premises and prohibition of grazing in the infected area should be made compulsory.

Anthropoid Apes (Gk *anthrōpos*, man; *eidos*, resemblance) is a term sometimes applied to large monkeys of the family Anthropomorphidae or Simiidae, on account of their morphological resemblance to man. They have no cheek-pouches or tails, are arboreal and omnivorous. There are extinct and fossil species, but there also occur living species in the gorilla, orang-outan, chimpanzee, and gibbon, which are found in the E. Indies and W. Africa. See T. H. Huxley, *Man's Place in Nature*, 1863; R. Hartmann, *Anthropoid Apes*, 1883; R. M. and A. W. Y. Yerkes, *Great Apes*, 1929; Zuckermann, *Functional Affinities of Man, Monkeys, and Apes*, 1933.

Anthropolatry (Gk *anthrōpos*, man, *latría*, worship), payment of divine honours to a human being, a term always used in a condemnatory sense (cf. APOTHEOSIS). The charge of A. was brought against the heathen by the early Christians.

Anthropology, the study of man, involving the consideration of man's place in the animal kingdom as determined by his physical, mental, and moral characteristics, his hist. and development, the origin and growth of language, ethics, religion, and social institutions; the div. and subdiv. into races, nations, and castes, and all the manifold activities of which man is capable. The subject may be divided into 2 branches—the study of man as a physical individual (physical A. etc.), and of man as a member of society (social A., ethnology, ethnography; sociology, archaeology, and linguistics are closely related).

Physical anthropology aims at studying man as a physical member of a race, at studying the range of biological variation in mankind and at reconstructing man's physical origins and development from the primates. Physical A. has spent much time trying to establish significant criteria, factors that are transmitted genetically and are not affected by external considerations such as climate and disease. For a long time most attention was devoted to the skull and other skeletal material, because it was only upon such material that the palaeo-anthropologist could rely to reconstruct man's development. This work has gone hand in hand with primatology.

The more important finds of fossil man include the 2 early types (often called Protoanthropic) of giant man exemplified by *Meganthropus palaeojavanicus*, found in Java in 1941, and *Gigantopithecus blacki*, whose giant teeth were found in Chinese apothecaries' shops; both these types were found by von Koenigswald. Then there are the palaeoanthropic types, exemplified by *Pithecanthropus erectus*, 'Java Man,' found in Java at various times between 1890 and 1939, by Dubois and von Koenigswald; other types found in Java are *homo modjokertensis* and *homo soloensis*; *Sinanthropus pekinensis*, 'Peking Man,' like Java Man of the Middle Pleistocene age but of more advanced type, was found in 1929. *Homo rhodesiensis*, found at Broken Hill in 1921, and *Africanthropus njarasensis*, found in Tanganyika in 1934, are from Africa and similar to the Java-Peking types; Heidelberg Man (q.v.) and Neanderthal Man (q.v.) are probably the last of the Palaeoanthropic types. Among the more important Neanthropic types are the Cromagnon men, late contemporaries of the Neanderthal men, and found first at Cromagnon in S. France in 1868; others were found at Mentone in 1872 and 1902 and at Paviland in Wales; others include Grimaldi Man, skeletons of a woman and a child, the latter being stained with red ochre, the Predmost people found near Brunn between 1888 and 1928, and the Fontchevade skulls found in 1947 in Charente, France, physically a late neanthropic type but of earlier date than the Neanderthal types, thus showing there was no necessary evolutionary sequence between the two; finds of Neanthropic types in England include the London skull found in 1925; Swanscombe man, found in 1935-6 in Kent; the Galley Hill skeleton, found near Swanscombe in 1888 and which now seems much more recent than was once thought; and the Wallbrook skull found in London in 1943 near the site of the London skull. The once famous Piltdown Man (q.v.) has now been discovered to have been a forgery. It is now accepted that many of the Neanthropic types predate some of the Palaeoanthropic men, and the Neanderthal types show signs of greater cultural development (in the forms of implements found at the sites and the signs of burial) than do many of the Neanthropic types. The older notion of linear development of man from primates must be given up; man's development has been rather multilineal, there being many centres of development and distribution. One such is that of early Java man, through the later Wadjak man, found in 1889 by Dubois in Java, and the Australian Aborigines: a clear line of development can be traced here. The same can be done in certain other cases elsewhere, as in the possible line of fossil remains found in S. Africa at Boskop, Florisbad, and elsewhere, which seem to represent the ancestors of the Bushman people. The earliest remains in the Americas date from only some 25,000 years, their earliest

inhab. presumably originating in Siberia and crossing the Bering Sea in recent times.

The work of Boas (q.v.) and others on changes in skull measurements of Central and E. Europeans after a few generations in America showed that for classification of modern man skeletal criteria were inadequate, physical measurements of those sort apparently being affected by climatic and social conditions. Recently much attention has been given to finding more stable genetic criteria for the tracing of relationships between various types of man and for the comprehending of the range of physical variation found in man to-day. The main criteria used have so far been those to do with blood types. Landsteiner and others first isolated the blood types A, B, AB, and O, which have been used in Physical A. for racial classification. Later work has been done on M, N, and MN types, on the Rhesus factor in blood, and on the sickle-cell trait, also in blood. The latter is now thought to have a connection with the incidence of malaria and so not to be suitable as a stable genetic factor. Other criteria are also being used in experimental work, such as the P.T.C. reaction (ability to taste phenylthiocarbamide), which seems to be genetically determined. From none of these can a simple clear classification of man be possible due to the immense amount of racial intermixture and migration that has occurred: a pure 'race' does not exist anywhere. But a body of knowledge as to origin, variation, and dispersal of types of man is being assembled.

Social anthropology and ethnology. Social A. is the study of human culture and the ways in which men are organized into societies and communities. It is a recent discipline and has developed from the older ethnology, the 'study of peoples,' which differ from and resemble one another in culture as well as in racial character. The ethnologist is concerned to classify people on a cultural basis and to discover their relationships and migrations in the past.

Inspired by ideas of biological evolution, and by the schemes of evolution of material artifacts which originated in the work of the archaeologist de Perthes, the early ethnologists tried to construct schemes of social evolution, to show the development of cultures. Of these perhaps the most important were lawyers, concerned to show the development of political and allied institutions, and with a background of rigorous legal training which has made their work of formidable significance. Such were the American, L. H. Morgan (q.v.), the English Sir H. Maine (q.v.) and J. F. McLennan, and the Swiss, J. J. Bachofen, whose *Das Mutterrecht*, 1861, postulated an original stage of matriarchy in all societies and whose influence is not yet dead.

In England Sir E. B. Tylor (q.v.) and Sir J. G. Frazer (q.v.) mark the end of what may be called the 'historical' phase of A. Both attempted to formulate stages of cultural evolution, and were

concerned particularly with the origins and development of religion and magic. They were followed by many lesser workers such as Crawley, Marrett, and others, whose work is to-day regarded as of little importance. Their work was vitiated by the reliance on what has been called 'conjectural history' and the comparison of isolated traits of culture from many societies without a very rigorous understanding of the social matrix within which these traits acquire their true social significance. In England the work of the diffusionist ethnologists (who argued that all culture of significance originated in a single source—in this case, ancient Egypt) culminated in that of Elliott Smith, Perry, and W. H. R. Rivers, only the last named being remembered to-day for his pioneering work on kinship and primitive psychology. Outside England the work of Fr. W. Schmidt (q.v.) into the origins of religion have been of considerable influence.

The turn of the cent. marks the beginning of modern social A. with the beginning of organised field research by the Cambridge Expedition to the Torres Straits, led by A. C. Haddon, and the Jesup Expedition to Baffinland, which included Boas. Later work by Radcliffe-Brown and Malinowski led to refinement of research techniques and laid the ground for modern social A. Haddon, his disciples Selkman, Rivers, Radcliffe-Brown, and Malinowski in England, and Boas and his followers Kroeber and Lowie in U.S.A., have trained almost every senior Eng.-speaking anthropologist alive to-day. There has now become available a great body of empirical data which can be used as a basis for the formulation of hypotheses about human societies, rather than the mere illustrative material for historical hypotheses already determined upon other grounds, as was used by the 19th-cent. ethnologists and Tylor and Frazier.

An important influence on modern social A. has been that of the Fr. sociologist Durkheim and the German Weber. Durkheim stressed the notion of a social activity or institution being significant by the function it has in the social life of the community as a whole, and he realised that a society can be studied as a social system, the psychological system of an individual being relegated to the psychologists and so outside the sphere of the anthropologist. Although this extreme view is not accepted by all anthropologists, the concept of the functional interrelationship of all aspects of a society's culture has been valuable, and has shown that the piecemeal comparison of individual cultural traits drawn from many different societies, as was done by most of the ethnologists previously mentioned, was based on a misconception.

With the concept of social function has been developed that of social structure, defined as the complex network of actually existing social relations between the members of a society or community. Modern analysis has been devoted largely to showing the social structure of societies

as being the subject of research that is most rewarding, as providing an understanding of the ways in which societies actually function, and as providing the social matrix in which traits of culture can best be understood and compared. Examples are the work done by modern Brit. social anthropologists, e.g. that of Evans-Pritchard on Nuer political organization and religion and on Azande witchcraft and magic, Fortes on Tallensi politics and kinship, R. Firth on social organisation of the Polynesian Tikopia.

At the same time, especially in America, the development of psychology has affected social A. considerably, and much work has been done on the ways in which individuals are socialized in their societies, on the place of the individual within his society's culture, on the relation between personality and culture, and so on. Perhaps the best-known workers in this field are R. Linton and Margaret Mead.

From its beginnings social A. has dealt largely with 'primitive,' non-W. peoples. From the anthropological viewpoint all societies and their cultures are of equal value as providing evidence of variations in culture and social organization—anthropologists try to avoid making value judgments as to whether one society is 'better' or 'worse' in a moral sense than another. An important point is that to make a total functional study of a small-scale society is easier than to make that of a large W. society, and it is easier for the worker to see the former objectively, whereas he is bound up in the values and opinions held in the latter. In addition, an interest in the application of A. to the problems of colonial administration has led to a concentration of interest on colonial peoples. All these factors have led to a decrease in interest in traditional ethnological problems of evolution and diffusion of cultures, and to an increase in functional problems of the ways in which actual societies function as single entities. A great deal of work has also been done on problems of social change, especially in colonial situations, as the change is actually visible at the moment without any conjectures of how it may have occurred in the distant past. Recently a good deal of interest has been taken also in the workings of our own W. society, and of other large-scale societies such as China and India. The work of Lloyd Warner and his associates, mainly American, on the Amer. class system and Amer. Negro-White society has been among the most important of this type of work.

Other branches of A. dealing with man in his social aspect include *Ethnography*, the describing of peoples and their cultures. *Technology* is the study of the origins and growth of the utilitarian and aesthetic arts, i.e., with material culture of human societies. It is closely allied to *Archaeology* (q.v.), the ethnology and ethnography of societies that no longer exist. *Linguistics* is concerned with the growth, structure, and distribution of the languages of mankind and is a valuable

adjunct to ethnology as well as being a discipline in its own right. See MAN; BLOOD; ARCHAEOLOGY.

Bibliography. GENERAL: A. C. Haddon, *History of Anthropology*, 1934; T. K. Penniman, *100 Years of Anthropology*, 1935; R. Linton, *The Study of Man*, 1936; F. Boas, *General Anthropology*, 1938; E. D. Chapple and C. S. Coon, *Principles of Anthropology*, 1948; C. Kluckhohn, *Mirror for Man*, 1949; Royal Anthropological Institute, *Notes and Queries on Anthropology* (6th ed.), 1951; A. L. Kroeber, *Anthropology*, 1952. PHYSICAL ANTHROPOLOGY: R. Benedict, *Race, Science, and Politics*, 1943; E. A. Hooton, *Up from the Ape*, 1947; M. F. Ashley-Montagu, *An Introduction to Physical Anthropology* (2nd ed.) 1951; UNESCO handbooks on Race, various authors. SOCIAL ANTHROPOLOGY: R. Benedict, *Patterns of Culture*, 1935; R. Lowie, *History of Ethnological Theory*, 1937; F. Boas, article 'Anthropology' in *Encyclopaedia of the Social Sciences*, 1947; E. E. Evans-Pritchard, *Social Anthropology*, 1951; J. H. M. Beattie, article 'Social Anthropology' in *Outline of Modern Knowledge*, 1956. Some important monographs of Social A.: B. Malinowski, *Argonauts of the Western Pacific*, 1922, and *Coral Gardens and their Magic*, 1935; A. R. Radcliffe-Brown, *The Andaman Islanders*, 1922; R. Firth, *We, the Tikopia*, 1936; E. E. Evans-Pritchard, *Witchcraft, Oracles and Magic among the Azande*, 1937, *The Nuer*, 1940, and *Nuer Religion*, 1956; Margaret Mead, *From the South Seas*, 1939. TECHNOLOGY: R. U. Sayce, *Primitive Arts and Crafts*, 1933. LINGUISTICS: J. R. Firth, *The Tongues of Men*, 1937.

Anthropomorphism (Gk *anthrōpos*, man; *morphē*, shape), word of modern adaptation, signifying the attribution of human physical and moral qualities generally to God or the gods. The most recent extension of the word is by psychologists to denote the principle according to which man is said to interpret all things through himself.

Anthropophagi, tribe of cannibals mentioned by Pliny as inhabiting a region near the Caspian Sea, and perhaps identical with the Androphagi (q.v.). They pursued the custom of eating the flesh of their aged parents in order to preserve the ancestral soul from decay.

Anthropophagy, see CANNIBALISM.

Anthus, generic name of the pipits, birds related to the wagtails and placed in the family Motacillidae. The meadow pipit or 'titlark' (*A. pratensis*), found in Great Britain is an inhab. of Europe and W. Asia. The tree pipit (*A. trivialis*) is a summer visitor to the British Isles.

Anti-Aircraft Defence. A.-A. D. existed in the First World War, and by 1918 consisted of under 300 guns, about 375 searchlights, and a dozen fighter squadrons. After the war, in 1922, 4 heavy A.-A. brigades and 2 searchlight battalions were formed, all for London. But it was not until 1936, when the political horizon began to darken, that there was a complete A.-A. div.; and by 1938 there was a

corps of 5 divs. In the year in which the Second World War broke out there were 7 divs. forming a command. A year later a formidable artillery manned by skilled gun crews was available against the attack by the Ger. Luftwaffe. In 1943 the A.-A. Command, under Gen. Sir Frederick Pile, had 2 main research stations, employing large numbers of scientists, and progress in research was very marked. An integral part of the A.-A. Command was the Royal Observer Corps, the duties of which included listening with headphones and the use of a plotting instrument (a circular dial, marked with numbers and squares), on top of which was an altitude finder. These observations were reported into the telephone to a centre, the mouthpiece of the phone being fixed over the listening observer's chest. At the centre 'tellers' charted the progress of the reported aircraft, and as raiders passed out of the area of the centre the neighbouring centres were warned of their approach. The whole A.-A. Command was a network of communication working in conjunction with the Royal Corps of Signals. Every gun and searchlight site was connected with its gun-operations room and the neighbouring site. Gun and light sites, observer posts, operations room, fighter sectors, and air fields were all interconnected in a labyrinth of phone cables, supplemented by radio and dispatch riders. The Royal Army Ordnance Corps supplied and maintained all the guns and instruments, lights, and generating sets of the A.-A. Command.

Experience in the Second World War showed that though A.-A. guns destroyed numerous raiding aircraft, the value and effect of A.-A. gunfire was, generally speaking, to keep hostile aircraft at a great height, and to prevent them from following a straight and even course necessary for accurate bombing. An important function of A.-A. guns is also to indicate the position of hostile aircraft to fighters, which is done by firing rounds to burst as near as possible. Sev. times Brit. A.-A. gunners shot down more than 50 Ger. planes over Britain in a week. On 15 Aug. 1940 they destroyed 23. In the first 2 years of the war some 600 were shot down by A.-A. fire over Britain (as against 4000 shot down by fighter planes). In the closing stages of the war A.-A. guns were most successful in winging or destroying in mid air flying bombs projected from sites in France and the Low Countries. A.-A. Command's value as part of U.K. defence structure came under review with the development of the guided missile, and it was finally disbanded in 1955. See FLYING BOMB and RADAR; see also Sir F. A. Pile, *Ack Ack*, 1949.

Antiarchs, Devonian placoderms (q.v.), fishes with the front of the body and head covered by armoured plates. The flattened ventral surface and dorsal eyes indicate a bottom-dwelling mode of life. They had articulated pectoral appendages, a heterocercal tail, and either a scaled or a naked body. *Bothriolepis* is a typical member.

Antiarin ($C_{14}H_{20}O_4 + 2H_2O$), active principle of *Antiaris toxicaria*, the poisonous upas-tree of Java. It is intensely poisonous and is used as an arrow-poison.

Antiaris, botanical name of a genus of trees of the family Moraceae found in the E. Indies. *A. toxicaria* is the upas-tree of Java, which contains a deadly poison but an unwarranted reputation for killing people who fall asleep beneath it.

Antibes (auct. Antipolis), Fr. fishing tn and resort on the Riviera (q.v.), in the dept of Alpes-Maritimes. Juan-les-Pins (q.v.) is part of the tn. There are many luxurious hotels and villas, an auct church (12th-17th cents.), and a 17th-cent. castle, now a museum, which contains a notable collection of works by Picasso (q.v.). There is a trade in olives, oranges, flowers, and perfume. Pop. 24,000.

Antibiotics, substances produced by bacteria, fungi, and actinomycetes which inhibit the growth of other micro-organisms. Since the discovery of penicillin (q.v.) research has produced many other A. At the time of writing (1957) A. in general use are penicillin, streptomycin (q.v.), aureomycin, terramycin, chloramphenicol (chloromycetin—a derivative of nitrobenzene with chlorine atoms in the side chain), bacitracin, the polymyxins, and erythromycin. There are sev. others which are still in the experimental stage. The mode of action of the A. may be broadly divided into those which are bactericidal—i.e. kill bacteria—as well as bacteriostatic—i.e. inhibit the growth of bacteria—and those which are almost wholly bacteriostatic. Penicillin, erythromycin, and streptomycin are powerfully bacteriostatic and in some degree bactericidal, while aureomycin, terramycin, and chloramphenicol are almost wholly bacteriostatic. Clearly the bactericidal A. are the more powerful. Some bacteria are more sensitive to certain A. than to others, and in treating a case it is usual to find out first the sensitivity of the infecting organism to the various A. so that the most effective may be selected in treatment. Strains of bacteria which are resistant to A. are becoming increasingly common, but whether this is due to the survival and multiplication of naturally resistant strains or to an acquired resistance is not certain. There is a danger, if A. are used indiscriminately, that in time the pop. may be exposed to the risk of infection with bacteria which are uncontrollable. There is no fixed dosage for A. An overdose, generally speaking, is harmless and the main aim is to give sufficiently large initial and subsequent doses to overcome the infection. The size of the dose necessary to accomplish this varies with the nature of the infection, the part of the body infected, and the sensitivity of the infecting organism. In general infections the A. are usually administered by hypodermic injection but recently a form of penicillin which can be taken by the mouth has been produced. For local infections they may be given in the form of ointments, drops, or

by inhalation in a spray as well as hypodermically. Penicillin is the most effective all-round antibiotic, and is particularly lethal against what are known as the gram-positive organisms (see BACTERIA), namely staphylococcus, pneumococcus, streptococcus, gonococcus, and the spirochaetes of syphilis (q.v.). Streptomycin is mainly effective against gram-negative organisms, particularly the *Mycobacterium tuberculosis* (see TUBERCULOSIS). It may produce toxic effects such as giddiness, tinnitus, and deafness. Strains of *M. tuberculosis* resistant to streptomycin appear fairly readily and present a problem in treatment. Aureomycin, terramycin, and chloramphenicol are effective against gram-positive and gram-negative organisms (except those of tuberculosis and diphtheria) and also certain virus diseases. These A. are apt to produce toxic effects more often than the others and chloramphenicol in particular is used with caution as it may cause a blood disease known as agranulocytosis. Bacitracin has toxic effects on the kidneys and for this reason is little used. The polymyxins have a limited use and are given only when other A. have failed. See also PENICILLIN.

Antibiotics in agriculture and horticulture. The study of A. for the practical control of certain plant diseases has already yielded promising results. The first effective control of a plant disease was recorded in 1944, when a penicillin-containing filtrate of *Penicillium notatum* was used to control crown-gall disease (*Agrobacterium tumefaciens*). In 1946, streptomycin was shown to be effective against plum bud-wood (*Phytophthora pruni*). Thereafter, scarcity of materials and economic considerations slowed progress, but since 1952 trials of A. under field conditions have become increasingly possible. A. have shown most promise in the control of the bacterial diseases of plants. Since most of these diseases are caused by gram-negative organisms, penicillin (active against gram-positive organisms) is only of limited value and has been little used; but the 'broad-spectrum' A., particularly streptomycin, sometimes in combination with terramycin, have been found effective against many of the bacterial diseases of fruits, tomatoes, commercial vegetable crops, and flowers. Commercial formulations of streptomycin are on the market in U.S.A. and New Zealand for spray application, but not, in 1957, in Britain. As seed-dressings, A. have shown less promise since they become inactivated in the soil. Many A.—cycloheximide, helixin, endomycin, antimycin, toximycin, griseofulvin—have proved to have systemic antifungal properties that promise the control of fungal diseases in plants. The most promising appears to be griseofulvin, derived from *Penicillium griseofulvum*, and can be produced in quantity by deep fermentation. Field trials in 1954-6 have shown that griseofulvin can be used to control a wide range of pathogenic fungi in plants, including those

responsible for such common diseases as apple scab, verticillium tomato wilt, plum silver leaf, celery leafspot, tulip fire, lettuce grey mould, and early tomato blight. A more recent research finding also indicates that pre-treatment of plants with A. such as streptomycin may confer a degree of protection against pathogenic fungi; the fungus, *Phytophthora infestans*, that causes blight in potatoes and tomatoes, has been checked in this way.

Although it is possible that resistant strains of pathogenic organisms may arise with the increasing use of A. for the control of diseases of plants, no evidence of this has yet been noted, and their advent may be looked upon as potentially valuable additional weapons against bacterial and fungal diseases of plants.

Antibody, specific constituent of the body fluids which may be present naturally or which may be formed as a result of the inoculation of antigens (q.v.). See BACTERIA, Immunity.

Antiburghers, name given to those members of the Secession Church of Scotland who in 1747 condemned the burghs oath, and formed the General Associate, or Anti-burgher, Synod.

Antichrist. Though the idea of A. is common enough in Jewish and early Christian sacred writings, the anti-Messianic power is very shadowy and indeterminate, partly perhaps because of the dual meaning of the Gk preposition *anti*, implying both substitution and opposition. Thus the A. may be either a false claimant to Messiahship or an opponent of the true Messiah. The conception of A. first appears in the O.T. in Dan. vii as the little horn, Antiochus IV, a type of St Paul's Man of Sin (cf. Mark xiii. 14). In the N.T. the word A. occurs only in the Epistles of John (Bk. 1, ii. 18 and 22; iv. 3; Bk. 2, verse 7), where it denotes an antagonist to Christ; but in the synoptic gospels is found the old Jewish conception of A. as a false Messiah. St Paul (2 Thess. ii) teaches that before the second coming of Christ the Man of Sin will appear. Most modern commentators regard him as a mere personification of the evil forces that resist Christ, and will come to a head at the end of the world. This agrees with Christ's reference to many false Christs already at work. The Apocalypse similarly portrays the persecuting political forces of the world, and false prophets by the two beasts, who are Satan's emissaries. Nevertheless, St Paul's teaching, and that of the Sacred Books generally from Daniel to Revelation, does suggest the probability that the coming of an individual A. at the end, greater than all earlier leaders of evil and irreligious forces is truly prophesied in scripture. The identification of such leaders in the past is not necessarily erroneous (for the whole Christian era is in the scriptural sense 'the last times' and the Lord is at hand in every Christian generation), but it does not exclude that ultimately there will appear the supreme and specific A. proper. Certainly in the mind of the

writer of the Apocalypse the evil forces of his own day (as 1 John ii. 18 says) were types of the ultimate Beast. The number of the Beast '666' (Rev. xiii. 18) was identified with Nero by the Christians. The Gk title NERON CAESAR written in Heb. characters, if those characters are taken as Heb. numbers (as they could be), adds up to 666. See A Catholic Commentary on the Holy Scripture, 1953; see also ESCHATOLOGY.

Anticlimax or **bathos** is the opposite of climax (q.v.) and consists of a ludicrous descent from the sublime to the commonplace or ridiculous. It may be either unintentional, as in Grainger's line: 'Now, Muse, let's sing of rats,' or deliberate, as in the anonymous:

And thou, Dalhousie, the great god of war
Lieutenant-General to the Earl of Mar.

See also FIGURE OF SPEECH.

Anti-Comintern Pact. This pact was signed by Germany and Japan in Berlin on 25 Nov. 1936, being, ostensibly, an agreement for mutual defence against Communist subversive activities. In its preamble the agreement refers to the 'aim of the Communist International, known as the Comintern, to disintegrate and subdue existing states by all the means at its command,' and records the conviction of the signatories that the interference by the Communist International in the internal affairs of the nations 'not only endangers their internal peace and social well-being but is a menace to world peace.' By the first of the 3 articles of the agreement, the 2 countries agreed to inform each other of Communist activities and to collaborate in preventive measures; by the second article they agreed jointly to invite other states whose internal peace was threatened by the International to come into the agreement; and by the third article the agreement was to remain in force for 5 years, 'but before expiration the parties will come to an understanding for the further method of their co-operation.' On 6 Nov. 1937 Italy announced that she had joined the pact. A year later (Jan. 1939) Hungary joined the pact. Later in the same year Franco's Sp. Gov. also joined, and in 1941 the Nazi satellites—Slovakia, Rumania, Bulgaria, etc.—also signified adherence to the pact; though between Sept. 1939 and June 1941 the Russo-Ger. pact seemed to put the A.-C. P. into abeyance. Public opinion in the W. democracies condemned the pact as a thinly disguised alliance, designed, not principally to combat international Communism, but to pursue a policy of aggression against any states which might not be able to resist absorption—in short, a pact to overawe and dominate the world.

Anti-Corn Law League was formed in 1838-9 at Manchester. Its object was to effect the repeal of the corn laws in Britain. The cause was promoted by oratory and by a paper called *The League*; and among its leading supporters were Cobden, Bright, and Villiers. It dissolved itself when its object was achieved in 1846-9.

Anti-corrosive, material employed to prevent the rusting of iron when exposed to moisture or other harmful influences. A.s are of 2 classes: protective, such as an application of hot tar or some magnetic oxide of iron; and galvanic, such as a coating of zinc or some other electropositive metal to which the corrosion is transferred.

Anticosti, is in the Gulf of St Lawrence, which it divides into 2 channels. It is lowlying and sterile, though there are considerable salmon, trout, and herring fisheries, and seal and bear hunting. It is 140 m. long and 30 m. broad. In 1896 it was purchased and stocked as a game preserve by M. Menier.

Anticyclone, atmospheric system marked by an area of high barometric pressure, caused by descending air, and surrounded by closed isobars. The descending air becomes warmed and dried, and transmits radiation freely. Anticyclonic weather is quiet and settled, with low winds blowing clockwise around the centre in the N. hemisphere and anticlockwise in the S. hemisphere. In summer the A. brings fine sunny weather to the Brit. Is., but in winter there are two types of A., one with overcast skies and the other with clear skies, frosty nights, and early morning fog. The term 'anticyclonic gloom' is sometimes applied to the overcast winter type.

Anticyra, name of 3 anct Gk tns, the most celebrated of which was in Phocis. It was noted for hellebore, a traditional remedy for madness.

Antidotes, medicines that relieve or remove the symptoms caused by poison. An antidote may be *chemical*, i.e. one that changes the nature of the poison so as to make it insoluble or harmless; *mechanical*, i.e. one that prevents absorption by holding the poison in mechanical suspension, or by coating the stomach; or *physiological*, i.e. one that counteracts the physiological effects of a poison. A *universal* antidote is provided by mixing 1 part of dissolved iron sulphate with 2 parts of *magnesia* water.

To mineral acid poisons, alkalis are A. The most suitable are lime, soap, chalk, potash, soda, or *magnesia*; they should be moderately diluted with water. Freshly precipitated oxide of iron, followed by a solution of potassium carbonate, is to some extent a chemical antidote to prussic acid. Atropine is an antidote to aconite, hellebore, veratrine, and morphine. Weak acids such as vinegar are A. to alkalis. Tannin or tea, charcoal, and morphine are A. to atropine and belladonna. Epsom salts and Glauber's salt are A. to carbolic acid. Potash and injected atropine or strychnine are A. to chloral. Egg albumin and milk form an antidote to copper salts. Ammonia is antidotal to formalin. Zinc sulphate is an antidote to lead salts. Potassium permanganate is an antidote to opium or morphine and to strychnine if immediately administered.

Antietam, narrow, deep riv. in Maryland, U.S.A., flowing into the Potomac. A prolonged battle was fought on its banks

between the Federals and the Confederates in Sept. 1862. The former were victorious, but with the loss of nearly 13,000 men.

Antifebrin, *acetanilide* (chemical symbol $C_6H_5.NH.COCH_3$), crystalline substance obtained by acting on aniline with glacial acetic acid. It is an analgesic and antipyretic, though it is undesirable to use it when the fever is prolonged, as its effects pass off so quickly, and relieves the pain of migraine and neuralgia. It is liable to produce alarming symptoms, such as gasping respiration, cyanosis (darkening of the skin through deficient oxidation of the blood), and collapse. In susceptible persons these symptoms may be brought on by even small doses.

Antigen, any substance which after inoculation into the body is capable of giving rise to antibodies (q.v.) in the animal body. See BACTERIA, *Immunity*.

Antigone, daughter of Oedipus and Jocasta, accompanied her father into exile at Colonus. After his death she went to Thebes, where Haemon, son of Creon, the king, fell in love with her. Her brothers, Eteocles and Polynices, slew each other in single combat, and A., disregarding Creon's edict, buried Polynices. As a punishment she was shut up in an underground cave, where she afterwards hanged herself. Haemon in despair put an end to his life. Sophocles immortalised her in *Antigone* and *Oedipus at Colonus*. Euripides also used a version of the theme in his *Phoenician Women*. A modern treatment of the story is given in Anouilh's (q.v.) *Antigone*.

Antigonish, cap. tn of co. of same name, Nova Scotia. It is the seat of the Catholic Bishop of Arichat, and contains St Ninian's Cathedral and the univ. of St Francis Xavier. It is a banking tn, a port of entry into Nova Scotia, and a distributing centre for a large agric. dist.; it has a weekly newspaper, the *Casket*. Pop. 3200.

Antigonus (382-301 BC), known as Cyclops (the one-eyed), one of the generals of Alexander the Great. In the div. of the kingdom after Alexander's death he received Greater Phrygia, Pamphylia, and Lycia. He was forced to flee into Greece, and found favour with Antipater, regent of Macedonia. On the death of Antipater, he determined to win the lordship of Asia, and subdued Asia Minor and Syria. He assumed the title of king in 306 BC. He failed in an attempt to invade Egypt, and fell in a decisive battle at Ipsus (301) in his eighty-first year.

Antigonus Doson, King of Macedonia (229-221 BC), was grandson of Demetrius Poliorcetes. He assumed gov. on the death of Demetrius II and married Chryseis, the queen-mother. His reign was a critical period in the hist. of the interaction of the Gk states. He co-operated with Aratus and the Achaean league against Cleomenes, King of Sparta, invaded Laconia in 221 BC, and by the victory of Sellasia made himself master of Sparta. He repelled an invasion of the Illyrians in Macedonia, and d. a few months later in 220 BC. The appellation, 'Doson' ('about to give') satirically

marked his readiness to promise and slowness to perform.

Antigonus Gonatas (318-239 BC), Macedonian king, grandson of A. Cyclops and son of Demetrius Poliorcetes. He assumed the royal title on his father's death in 283, but did not obtain possession of the throne until 277. Pyrrhus drove him from his kingdom in 272; but he recovered it in the following year, and retained it until his death.

Antigonus of Carystus in Euboea, Gk writer who fl. during the 3rd cent. BC at the court of Attalus I of Pergamum. Fragments of his *Lives of Philosophers* have been preserved by Athenaeus and Diogenes Laertius. His *Collection of Wonderful Tales* was ed. by Keller in the first vol. of *Rezum Naturalium Scriptores Graeci Minores*, 1877.

Antigua, one of the W. Indian Is., is a Brit. possession, forming with Barbuda and Redonda one of the 5 presidencies of the Leeward Is. It was discovered by Columbus in 1493, settled by the English in 1632, made a bishopric in 1842. It is the seat of gov. of the Leeward Is. It became a crown colony in 1898. Chief tns, St John, Falmouth, and Parham. The is.'s natural harbours are St John's, English, Falmouth, Willoughby, and Parham. Sugar is cultivated, and molasses, tamarinds, and pineapples are exported, also Sea Island cotton, which is relieving the is.'s over-dependence on sugar and molasses. Area 108 sq. m. Pop. with dependencies 41,760. The is. was named by Columbus after the church of St Mary of A., Seville. It is an is. of rocky caves and dense thickets of thorny underwood, with picturesque ravines, intricate int paths, and dangerous shores lined with coral reefs. The settlement of A. is associated with the name of Sir Thomas Warner, whose son Edward led a party of Eng. colonists from St Kitts (q.v.) to A. in 1632, and was made the is.'s first governor by his father. Later the is., together with the other Leeward Is., was included in the patent granted to Lord Carlisle, the lessee of which grant was Francis, Lord Willoughby. Willoughby governed the Leeward Is. from Barbados, relinquished control in 1652, but returned after the Restoration and governed till 1666, when he was lost at sea. In 1666 the French took possession of A.; but in 1667 it was ceded to England by the Treaty of Breda. There were soon after the cession only 500 black people on the is., while a cent. later the pop. included nearly 39,000 slaves, 1230 free coloured people, and 2600 whites. The notorious Daniel Parke became governor in 1706. Violent differences occurred between him and the inhab., but he refused to resign and was at length killed by an infuriated mob on 10 Dec. 1710.

Nelson served (1784-7) at the dockyard of Eng. Harbour, where he hauled down the broad pennant of Commissioner Moutray, on the ground that he, Nelson, as captain of the *Boreas*, was senior officer of the station.

See Wm Dampier, *Voyages and Descriptions*, 1699; Capt. Thomas Southey,

Chronological History of the West Indies, 1827; *Antigua and the Antiguans*, 1844; V. L. Oliver, *History of the Island of Antigua*, 1895-9; C. Manington, *The West Indies*, 1925.

'**Anti-Jacobin**,' or '**Weekly Examiner**,' Eng. newspaper founded by George Canning and his friends to express their opposition to the principles and policy of the Fr. revolutionaries. The chief contributors were Canning, George Ellis, and John Hookham Frere, the paper being ed. by Wm Gifford (q.v.). It lasted from 20 Nov. 1797 to 9 July 1798.

Antilegomena (Gk, 'contradicted'), term applied to certain books of the N.T. whose inspiration was not at first universally acknowledged by the Church, viz. James, Jude, 2 Peter, 3 John, and the Apocalypse. The name was given in contrast to the other books, which were called Homologoumena (agreed to). See also BIBLE.

Antilibanus, or **Anti-Lebanon**, mt range in rep. of Lebanon, inferior in height to Lebanon, with which it runs parallel, and from which it is separated by the valley of Coele-Syria. Its highest peak is Mt Hermon, which is 9050 ft high.

Antilles, name often applied to the whole of the W. Indies is. between Florida and Venezuela, sometimes to the 2 large groups, the Greater A. and the Lesser A., or Caribbean Is. The Greater A. comprise the largest is., namely Cuba, Jamaica, Haiti-Dominican rep., and Puerto Rico, as well as the small is. near their coasts. The Lesser A. comprise the Windward and Leeward Is., with the Virgin Is., Barbados, Trinidad, and Tobago. For further information on the A., discovered by Columbus, see under the various names above mentioned.

Antilocapra, or **Prongbuck**, N. Amer. ruminant, somewhat resembling the antelope, but differing from it in having deciduous branched horns. The genus is also characterised by the absence of lateral hoofs. The animal stands about 3 ft high.

Antiochus, son of Nestor, King of Pylos, whom he accompanied to the Trojan war. Famous for beauty, swiftness, and skill, he was the friend of Achilles, who avenged him when he died saving Nestor from Memnon. He was buried with Achilles and Patroclus, on the headland of Sigeum.

Antilogarithm, see LOGARITHM.

Antimachus, Gk epic poet, b. c. 545 BC at Colophon. His works, which show little talent, are full of erudition and were valued by Plato. They include a *Thebais* and the long elegiac poem *Lyde*. A. also ed. the *Iliad* and *Odyssey*. See B. Wyss, *Antimachi Colophonii reliquiae*, 1936.

Antimelos, small, uninhabited is. to the NW. of Melos (q.v.) in the Cyclades, Greece.

Antimony, chemical metallic element (symbol Sb, atomic number 51, atomic weight 121.2) occurring in nature chiefly in combination with sulphur as stibnite, antimonite, or A. sulphide, Sb₂S₃. Other A. compounds found in nature are arseniferous A., As₂Sb, antimonial silver, Ag₃Sb, antimonial nickel, NiSb, A. oxide, Sb₂O₃, etc.

The metal is prepared by melting the sulphide in a reverberatory furnace so as to separate it from impurities of quartz, etc. The pure sulphide is then roasted in order to convert it into the oxide, which is afterwards reduced with carbon. Another method is the fusion of the sulphide with scrap iron, when iron sulphide and A. are formed. The A. is further purified by remelting with potassium carbonate and on solidifying it shows fern-like markings due to crystallisation, and is known as 'star-metal.'

A. is a lustrous silver-white metal. It has a sp. gr. of about 6.7, melts at about 630° C., is hard and so brittle that it can be easily powdered. It volatilises at a white heat in air, and may be distilled in a current of hydrogen. It does not undergo alteration on exposure to the air at ordinary temps., but burns on heating to form the oxide; if burned in contact with charcoal at a high temp. the oxide is evolved in dense white fumes. The metal combines directly with chlorine with evolution of much heat.

A. forms numerous useful alloys with other metals. Eng. type-metal is an alloy of lead, A., and tin; the A. imparts hardness to the alloy and that quality of expanding at the moment of solidification which gives a clear outline to the cast. Britannia metal consists of tin, A., and zinc; pewter contains tin, A., copper, and bismuth; and anti-friction metal is usually composed of copper, A., tin, and lead.

The chief compounds of A. are A. hydride, SbH_3 , a disagreeably smelling gas; A. trioxide, found in the mineral valentinite; pyroantimonie acid, formed by heating the white powder produced by the action of nitric acid on the metal; A. trichloride, a crystalline solid, but if prepared by boiling the sulphide in strong hydrochloric acid, a viscous mass, called butter of A.; and A. pentachloride, a heavy, colourless, fuming liquid.

In medicine, potassium antimonyl tartrate, known as tartar emetic, is administered in small doses as a diaphoretic and expectorant, and in doses of from 1 to 2 grains as an emetic. More frequently it is injected intravenously in the treatment of kala-azar (blackwater fever) and trypanosomiasis (sleeping-sickness). A. trisulphide is given in doses from 1 to 5 grains for the same purposes. In larger doses, A. is an irritant poison, causing vomiting and purging. Chronic antimonial poisoning is characterised by nausea, progressive weakness, and may end in death by exhaustion. In dyeing tartar emetic is used as a mordant.

Antinomianism (Gk *anti*, against; *nomos*, law), doctrine that faith in Jesus Christ dispenses with, and renders unnecessary, so far as a future state is concerned, the observance of morality and the performance of good works. The term 'antinomian' is not older than the Reformation. It was applied by Luther to the followers of John Agricola, his fellow townsman, who was b. at Eisleben in Saxony. At Wittenberg in 1537 Agricola maintained in a disputation the Antinomian point of view, which was controverted by Luther,

Melanchthon, and others. The Antinomian controversy was terminated in 1540 by a retraction by Agricola. A. found foothold in this country during the Commonwealth, but the assembly of divines in 1643 condemned sev. writings which appeared to them antinomian. Parliament in 1648 enacted that any one convicted, on the oaths of 2 witnesses, of maintaining that the moral law of the Ten Commandments is no rule for Christians, or that a believer need not repent or pray for pardon of sin, should publicly retract, or, on his refusal, be imprisoned till he found sureties that he would no more maintain these doctrines.

Antinoüs, see AQUILA.

Antinoüs, beautiful youth, b. Claudopolis in Bithynia, favourite of the Emperor Hadrian, whom he accompanied in his travels. In AD 130 A. committed suicide by drowning himself in the Nile. Hadrian not only enrolled him among the gods, but built temples, instituted festivals, and founded the city of Antinoöpolis in his honour. Numerous coins, statues, and other works of art survive to preserve his memory.

Antioch, now Antakya in Turkey. Founded by Seleucus 300 BC after the battle of Ipsus, 301. Acquired the name of 'Queen of the E.' Here the disciples were first called Christians, AD 42. A. was taken by the Arabs, 637; recovered by the E. emperor, 966; lost again, 1086; retaken by the crusaders in June 1098, and made cap. of a principality, 1099, and held by them till June 1268, when it was captured by the Sultan of Egypt. It was made part of Syria in 1920, but restored to Turkey in 1939. Pop. 30,000.

Antioch College, co-educational institution at Yellow Springs, Ohio, founded by Horace Mann (q.v.) in 1853. Academic training is not regarded as sufficient of itself to equip a student for a career and therefore the college is so organised that the student may divide his time between school and practical work in the economic community. The student-roll of 1956 contained about 1000 men and women. The college has a faculty of over 100 teachers. The Olive Kettering Library has over 100,000 vols.

Antiochus, name of 13 kings of Syria: Antiochus I, Soter (280-261 BC), son and successor of Seleucus I (see SELEUCIDAE; SELEUCUS).

Antiochus II, Theos (261-247 BC), son of the last.

Antiochus III, the Great (223-187 BC), son of Seleucus II. Having strengthened his kingdom, which had begun to disintegrate under his predecessors, he concluded a treaty with Parthia. Later he became involved in hostilities with Rome, and was decisively beaten, first at Thermopylae in 191, and then at Mt Sipylus in 190. (See HANNIBAL.) The terms of peace granted by the Senate (188) obliged him to pay a fine of 15,000 Euboic talents (more than half a million kilograms of silver). In order to raise part of this huge sum, A. attempted to plunder a temple in Elymais; but he was assassinated by the inhab. (187 BC).

Antiochus IV, Epiphanes (175-163 BC), son of the last and successor of his brother, Seleucus IV. He is known for his attempt to eradicate the Jewish religion, which gave rise to the heroic resistance of the Maccabees. A. d. in a state of raving madness.

Antiochus V, Eupator (163-162 BC), son of the last. Only 9 years old at the time of his accession, he was put to death by order of his cousin Demetrius I, Soter (q.v.).

Antiochus VI, Theos (144-142 BC), son of Alexander Balas; put forward as a claimant to the throne against Demetrius II Nicator (q.v.), but murdered by his own sponsor, Tryphon.

Antiochus VII, Sidetes (137-129 BC), younger son of Demetrius I. He succeeded Tryphon, who had temporarily dethroned Demetrius II, and fell in battle against the Parthians.

Antiochus VIII, Grypus (125-96 BC), son of Demetrius II, successor of his brother Seleucus V. The first part of his reign was occupied in war with his half-brother (later Antiochus IX), with whom he agreed to share the kingdom in 112.

Antiochus IX, Cyzicenus (112-95 BC), half-brother of Antiochus VIII (q.v.). He was killed in battle against Seleucus VI.

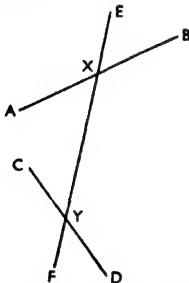
Antiochus X, Eusebes (95-93 BC), son of the last.

Antiochus XI, Epiphanes, second son of Antiochus VIII. He disputed the throne with Eusebes, by whom he was routed.

Antiochus XII, Dionysus, brother of the last. He held the throne for a short time against Eusebes, but fell in battle against the Arabian king, Aretas. On the death of Eusebes, his subjects, tired of the civil broils of the Seleucidae, offered the kingdom to Tigranes of Armenia, who united it to his own dominions and held it until his defeat by the Romans in 69 BC.

Antiochus XIII, Asiaticus (69-65 BC), son of Antiochus X. He succeeded to the kingdom on the defeat of Tigranes by the Romans; but was dethroned in 65 by Pompey, who made Syria a Rom. province. See E. R. Bevan, *The House of Seleucus* (2 vols.), 1902.

Antipaedobaptists, name given to those who deny the validity of infant baptism. They are generally known by the shorter title of Baptists.



Antiparallel. Two straight lines AB ,

CD , are A . with respect to a transverse line EF cutting them at X and Y respectively when $\angle EXB = \angle FYD$ and $\angle AXE = \angle FYC$.

Antiparos, anct. Olios, is. of the Cyclades group in the Aegean Sea, separated from Paros by a dangerous channel. Vines and grain are grown and there are deposits of zinc, lead, and iron. A. is famous for a superb grotto, very difficult of access, about 300 ft. by 100 ft. and some 80 ft. high, with stalactites and stalagmites.

Antipasch, Low Sunday (q.v.), Sunday after Easter Day.

Antipater, general of Alexander the Great, and regent of Macedonia in the absence of his sovereign (334-323 BC). On Alexander's death, in 323 BC, A. was appointed joint regent with Craterus (q.v.), and together they terminated the so-called Lamian war by defeating the Gk. forces at Crannon (322 BC). In the following year A. once more became sole regent, and d. in 319 BC.

Antipater, Lucius Caelius (fl. 125 BC), Rom. historian, was also an orator and lawyer. He was a contemporary of the Gracchi, and wrote a famous hist. of the Second Punic War. See O. Meltzer, *De L. Caelio Antipatro*, 1867.

Antipatharia, sub-family of coral. The growths, usually found at great depths, are slender and branched in appearance. The polyps resemble small anemones and have from 6 to 24 simple tentacles.

Antipathy (Gk *anti*, contrary; *pathos*, feeling) signifies an involuntary dislike or aversion, such as the aversion to the tastes and smells of many drugs, and the dislike of certain foods. Some A.s arise from fear and past unpleasant associations. Some people have A.s to certain animals, e.g. to cats or snakes, and some faint at the sight or sound of certain things. When such an aversion gives rise to considerable fear it is commonly called a *phobia*.

Antipatris, city of Palestine, at the edge of the plain of Sharon, on the main road from Jerusalem to Caesarea, built by Herod the Great (c. 10 BC), and named after his father Antipater. A. is frequently mentioned by Josephus. See also Acts xxiii. 31-2. It fell into decay in the 4th cent.

Antipaxo, very small Gk is. 1 m. to the SE. of Paxo, one of the Ionian group.

Antiphanes, Athenian comic poet of 4th cent. BC. The chief representative of the Middle Attic comedy. He is supposed to have written between two and three hundred plays, the extant fragments of which were collected in *Comicorum Atticorum Fragmenta* (T. Koch, 1884). See T. B. L. Webster, *Studies in Later Greek Comedy*, 1953.

Antiphilus, Gk painter of the Alexandrian age. He worked for Philip II of Macedonia and Ptolemy I of Egypt. He is said to have been a rival of his contemporary Apelles, and is described by Quintilian as 'excelling in light and shade and caricature' and Pliny mentions sev. of his works in various styles. He was also the inventor of a kind of caricature called *Grylli*. They were a species

of grotesque monsters, part man, part animal or bird.

Antiphlogistics, medicines which have the power of counteracting or allaying fever.

Antiphon (480-411 bc), earliest of the Attic orators, a member of the oligarchical party and largely responsible for the estab. of the Four Hundred in 410. On the restoration of the democracy he was condemned to death. He is often regarded as the founder of political oratory. His chief work was as a professional speech-writer. Only 15 of his speeches have come down to us. They are to be found in Reiske's collection and I. Bekker's *Attic Orators*, 1822-3.

Antiphon (Gk *anti*, against; *phōnē*, the voice), species of psalmody sung alternately. It probably originated in the ancient Jewish service and was introduced into Christian worship by Ignatius (d. AD 115), and into the Lat. Church by Ambrose, Bishop of Milan, in the 4th cent.

Antiphonary, **Antiphonarium**, **Antiphonal**, in music, book wherein the antiphons were written, a copy of which was kept in each church and monastic estab. Such books were often very ornate and costly.

Antipodes (Gk *anti*, against; *pous*, foot), term applied to places diametrically opposed on the earth, so that if a line were drawn connecting them it would pass through the centre of the globe. Noon at one place is midnight at the other, and the one's longest day corresponds with the other's shortest. The A. of England are A. Is., near New Zealand.

Antipolis, see ANTIBES.

Antipope, see POPES, LIST OF THE.

Antipyretics, remedies which tend to reduce the temp. in fevers. They may act (1) by the abstraction of heat, as in the use of the cold bath and ice, and by administering copious doses of diaphoretics and sudorifics; or (2) by lessening heat production by their action on the nervous system, as in the use of antipyrine, antifebrin, and quinine; or (3) by destroying the poison which causes fever; or (4) by increasing the dissipation of heat through their action on the skin or circulation, as alcohol, aconite, antimony, etc.

Antipyrine ($C_{11}H_{12}ON_2$), or *dimethylphenylpyrazolone*, organic substance used in medicine as a febrifuge.

It crystallises in white leaflets which melt at $113^{\circ}C.$, and is soluble in water and alcohol. The aqueous solutions gives a red colour with ferric chloride and bluish-green with nitrous acid.

A. has a slight effect on the temp. in health, but a marked one in fever. It has been used in almost every feverish condition, but its routine use is not now recommended as it may produce severe toxic effects. It relieves migraine, headache, and neuralgia, and predisposes to sleep after the pain has disappeared.

Antiquaries, **Society of**, formed in the 18th cent. to promote the study of antiquities. Earlier societies had been founded in the 16th and 17th cents., but it was not until 1707 that the society was formally reconstituted. A royal charter

was granted by George II in 1751; in 1780 George III granted the society apartments in Somerset House. It is governed by a council of 21 and a president who is also an *ex officio* trustee of the Brit. Museum. The H.Q. are at Burlington House, where its library is situated. See Joan Evans, *A History of the Society of Antiquaries*, 1956.

Antique, paper quality, see PAPER.

Antiquities, see ARCHAEOLOGY; MONUMENTS, ANCIENT; and PREHISTORY.

Antirrhinum, genus of plants belonging to the Scrophulariaceae found in temperate climates. *A. majus* is the snapdragon, which is common in Great Britain; *A. orontium*, the lesser snapdragon, or calves' snout, is a native throughout Europe. Intermediate and dwarf varieties can be grown and of almost any colour except blue.

Anti-Saloon League of America was founded in 1893 in Ohio for the total suppression of the liquor traffic. By means of agitations, legislative measures, and educational and publicity movements the organisation was instrumental in amending the Amer. constitution and bringing about prohibition. With the disappearance of prohibition again from the constitution, the influence of the league declined. In 1948 it was succeeded by the Temperance League of America, which in 1950 merged with the National Temperance Movement to form the National Temperance League.

Antisana, volcanic mt in the Andes Mts in Ecuador, S. America. It is about 18,714 ft high. The vil. of A. is at an altitude of over 13,000 ft on its W. slope.

Antiscii, old astronomical term (derived from the Gk *anti*, against, and *skia*, shadow) signifying those who live on the same meridian, but on opposite sides of the equator, so that their shadows at noon fall in opposite directions. See ANTOECI.

Antiscorbutics, remedies effective against scurvy. Under the Merchant Shipping Act, 1894, A. must be carried on Brit. ships. Lime-juice is often used, hence the nickname 'limey' applied by foreigners to Eng. sailors. See SCURVY.

Anti-Semites, name which was first applied to those who were opposed to the Jews in the second half of the 19th cent. (Anti-Semitism had, however, been prevalent all over medieval Europe, varying in intensity in different countries and at different times.) The modern movement originated in Russia and in the Balkan peninsula and then spread into Austria, Hungary, Rumania, Germany, France, and Algeria, in which countries the Jews were to be found in large numbers. This hatred of the Jews was not the outcome of antipathy to their religion, but arose on account of the wealth and power which they were accumulating. In Russia and Hungary the movement assumed a terrible aspect, and riots and murders took place in 1882. In Germany and Austria anti-Semitic parties arose, and a league was formed to restrict the liberties and political rights of the Jews. Thousands of Jews fled to Britain and to the

U.S.A. as a result. In 1894 the Dreyfus affair occurred in France, in which anti-Semitism played a vital part.

Although Jews are now to be found in most countries, the intensity of anti-Semitic feeling still varies greatly. Russia, Hungary, Austria, and E. Europe generally were, until the late 19th cent., the centres where the strongest animosity was shown. In France and, before the Nazi regime, in Germany, anti-Semitic actions conformed to the usages of the law, and, though exceedingly violent propaganda was common, the legal rights of Jews were upheld. In America and throughout the Brit. Empire anti-Semitism is almost unknown except as one of the many illogical sentiments that occasionally sway individuals, and the Jew is accepted as a fellow-citizen who merely belongs to a minority religion.

A terrible revival of anti-Semitic feeling swept through Germany with the rise to power, in 1933, of the Nazi party under Hitler. Ger. Jews, irrespective of class or attainments, were maltreated and deprived of their livelihood, and many of worldwide celebrity sought refuge in other countries—especially England and the U.S.A. Persecution applied equally severely to persons of Jewish or part-Jewish origin who were themselves baptised Christians. In this revival in Germany, anti-Semitism took the form of a political movement owing its impulse to Hitler, who founded his 'Aryan paragraph' (see ARYAN) on the teaching of Gobineau, Houston Stewart Chamberlain, and others, and made it, in effect, the cardinal feature of his policy of founding a Third Reich embracing only the pure Germanic or 'Nordic' peoples in W., Central, and E. Europe. In conformity with this idea, the Jews were declared to be the enemy of the Ger. people and their persecution became a settled policy which was pursued again in 1938, when Germany annexed Austria, and in 1939 on the annexation of Czechoslovakia. In Russia the Communists would not allow Jews to continue as capitalists or 'unproductive elements,' but, for the rest, they gave them equal rights. Jews have risen to very high office in the Soviet Union; but it would seem that anti-Semitism has not been eliminated from modern Russia, for in the last months of Stalin's life there were distinct signs of it in Soviet propaganda and in certain policy statements; though this official attitude was only temporary. It was in Poland and Rumania, with respectively 3,000,000 and 1,000,000 Jews, that the Jewish issue was most acute before the Second World War; much more than in other countries, even in Germany. Anti-Semitism was a semi-popular movement. This movement implied many motives and mental attitudes: the jealousy felt by the Polish lower middle classes of their Jewish rivals and competitors; the Socialism of the ignorant, in which the Jews were blamed as a sinister capitalist power; the deeply ingrained clerical hatred of the Jew as 'Christ's enemy'; and, finally, the fear of all govts. of the spread of Communism

among the great mass of impoverished Jewish artisans and outright paupers. In Poland and Rumania Jew and non-Jew had tended for cents. to remain in quite separate communities, and both were ignorant of the other's ideals and ways of life. This gulf of separatism was, at least in part, responsible for the passivity and apparent indifference with which the mass of Gentiles watched the slaughter of at least 4,000,000 Jews in the concentration camps of Belsen, Buchenwald, Auschwitz, Dachau, and Maidanek between 1935-45. Since the Second World War the estab. of the state of Israel (q.v.) and the considerable fall in the Jewish pop. in Central Europe, due to Nazi persecution, have helped to make anti-Semitism a force of little importance in Europe generally. In the Middle E., however, anti-Semitism has increased in the Arab states since Israel became a Jewish state and has received official encouragement in Egypt and Saudi Arabia.

See also AUSCHWITZ; BELSEN; 'MEIN KAMPF,' etc.

See A. Dushaw, *Anti-Semitism: the Voice of Folly and Fanaticism*, New York, 1943; James Parkes, *Anti-Semitism: an Enemy of the People*, 1945, and *The Emergence of the Jewish Problem*, 1946.

Antiseptics, agents which prevent putrefaction by destroying or arresting the growth or development of the germs upon which putrefaction depends. The process must be distinguished from disinfection, which destroys the germs causing disease, though the 2 terms are often confused. The theory that putrefaction and fermentation are due to the presence of minute organisms owes much to the researches of Pasteur, and Lord Lister was the originator of the method of treating surgical wounds by substances known to destroy or arrest the growth of these organisms.

The bacteria of putrefaction are always present in ordinary air, but they require certain conditions of temp. and moisture to develop. Thus it is found that extreme heat or cold kills bacteria and prevents infection. If therefore substances like milk or meat are boiled and then kept in hermetically sealed vessels they may be kept fit for consumption for an indefinite period. On the other hand, putrescible substances kept at a low temp. in refrigerators will remain unaffected, and advantage is taken of this fact in the transportation of meat from America, Australia, and New Zealand to this country. Absence of moisture is unfavourable to the growth of bacteria, so that the practice of drying fish, fruit, and meat is a method of preserving them. It should be observed, however, that food materials preserved in such a manner should be kept in a perfectly dry place, as they are liable to absorb moisture from the air, when putrefaction becomes possible. Jam owes its keeping qualities to the high sugar content, in which the osmotic pressure is too great to allow the activity of bacteria, though

here also the entry of atmospheric water vapour should be guarded against.

Besides these methods of preventing infection, there are certain chemical substances which have the power of destroying the germs of putrefaction. Their uses include the preservation of food and the prevention of septic poisoning in wounds. It is necessary, of course, that an antiseptic employed for preserving food should not be injurious or unpalatable to man, and that A. used for dressing wounds should not have an undue irritating effect upon the tissues. Salicylic acid is used for the preservation of food, but the use of boracic acid for this purpose is now illegal. It was, until recent years, much used to preserve milk, butter, meat, and fish. Salicylic acid is used to preserve beer, butter, fruit, and meat, but its employment is not completely innocuous, and therefore should be discouraged. The same criticism applies also to formalin, sometimes used for the preservation of cream.

Carbolic acid was for some time the chief antiseptic used in surgery, but its place has to a great extent been taken by mercuric chloride (corrosive sublimate) and mercury bichloride. Thymol, salicylic acid, phenyl salicylate, and boracic acid are also used as A., as well as alcohol, hydrogen peroxide, iodine, and proprietary derivatives of coal tar (e.g. Dettol). For the dressing of wounds not made by the surgeon iodoform is often employed. It does not kill the bacteria directly, the action on the micro-organisms being subsequent to a decomposition resulting, under the influence of the heat of the body, from fermentation induced by matter exuded from the wound.

The influence of the antibiotics (q.v.), the most modern and most used A. in surgery, on the results of surgical practice has been enormous. Pyæmia, septicæmia, and gangrene are now much more uncommon than formerly, and it has been found possible to treat wounds without resorting to amputations where that course would be impossible without A. Compound fractures and extensive wounds of the limbs do not, therefore, commonly mean the loss of the limb affected. Operations, too, are performed which were formerly considered too dangerous, particularly in connection with abscesses and diseases of bones and joints. Owing to the damage caused by A. to the tissues, and consequent delay in healing, the antiseptic method of nursing has now largely given way to the aseptic technique, which aims at preventing, by strict cleanliness, the entry of germs into wounds.

Anti-slavery. A movement for the abolition of the slave trade was started in England by Thomas Clarkson about 1782, after Lord Mansfield's decision in the Somerset case that slaves could not exist in England. He was assisted by Wm Wilberforce, and in 1792 a motion in favour of gradual abolition passed the Commons. In 1805 the trade was forbidden with new colonies, and in 1807 the General Abolition Bill extended the prohibition to all Brit. possessions. The

Emancipation Act of 1833 provided for the gradual abolition of the state of slavery in the colonies.

In the U.S.A. emancipation was practically accomplished in the N. states by 1799, and there was a gradual growth everywhere of public feeling in favour of total abolition. A. societies were founded in 1832 and 1833, and most Amer. writers, including Emerson, Bryant, Whittier, Lowell, Longfellow, and Mrs Stowe, lent their influence in the same direction. The famous emancipatory edicts of Lincoln in 1862, 1863, and 1865 secured the success of the abolitionists. *See also* SLAVERY AND THE SLAVE TRADE.

Antispasmodics, drugs which have the action of relieving spasms.

Antispast, tetrasyllabic metrical foot, composed of an iambus and a trochee, the first and last syllables being short and the middle ones long, as in 'Clytēmnēstrā'.

Antisthenes (c. 455–c. 360 BC), Gk philosopher, a pupil of Socrates, but not a member of the Platonic Academy. He opened a school in the Cynosarges (q.v.), whence his followers were often supposed to have derived their name, Cynics (q.v.). A.'s philosophy was a development of Socrates' dictum 'Virtue is Knowledge'; its simplicity, and the austerity of his own life, attracted the poorer classes and later exercised some influence on the Stoics. *See* H. Dudley, *A History of Cynicism*, 1937.

Antistrophe (Gk *anti*, against; *strophē*, a turning), part of an ode sung by the chorus on returning from left to right, having previously sung the strophe when moving from right to left. It is a feature of Gk drama.

Anti-Taurus, *see* TAURUS.

Antithesis (Gk *anti*, against; *tithenai*, to place), is a figure of speech in which the contrast of ideas is expressed by balancing one word or phrase against another, as in 'God made the country and man made the town,' or 'To err is human, to forgive, divine.' *See also* FIGURE OF SPEECH.

Antitoxin, term applied to substances elaborated by the body to counteract the toxins of bacteria. Their chemical composition is a matter of doubt, but they are known to be proteins. It is found that when the body is inoculated with small quantities of a toxin, increasing quantities of A. are generated to counteract the poison, so that the individual eventually acquires 'active' immunity; by chemical treatment the toxins can sometimes be converted into less harmful 'toxoids'; these are used for immunisation against diphtheria and tetanus. The serum treatment consists in inoculating an animal, such as a horse, with small quantities of toxin until it becomes immune, when the blood is withdrawn and freed from blood corpuscles; this constitutes the serum (containing A.), which may be regulated to any degree of potency and injected into the human blood system, providing 'passive' immunity. Active immunity protects an individual from a disease, whilst passive immunity is useful as a means of treatment, i.e. when the disease has already

been acquired; both methods are employed in diphtheria and tetanus. See BACTERIA, *Immunity*.

Anti-trades. At times steady winds blow in the upper air in a contrary direction to the trade winds blowing at the earth's surface. Thus in the N. hemisphere they blow from the SW. and in the S. hemisphere from the NW. They are not regularly developed.

Anti-Trinitarians. See ARIUS and UNITARIANISM.

Antitype (Gk *antitupos*, of corresponding form), the actuality of that which was prophesied. Thus, in Scripture, the paschal lamb is the prophetic type, of which Christ is the A.

Antium, now Porto d'Anzio, anct tn of Latium 33 m. S. of Rome, bp. of Caelgula and Nero. Its origins are obscure. From very early times until the 4th cent. bc it belonged to the Volsci, from whom it was taken by the Romans in 338 bc. On this occasion 6 ships of A. were captured, and their beaks (*rostra*) used to decorate the orator's tribunal in the Rom. Forum (hence our word *rostrum*). Under the empire A. was a favourite residence of sev. emperors and noble families, remains of whose villas may be seen along the shore. Excavations at A. have yielded the only known example of a pre-Julian calendar, found painted on a wall.

Antivari, see BAR.

Anti-vivisection, term used to indicate opposition to experimentation on animals based on medical and scientific rejection of claims made by vivisectionists as well as on sentiment and the moral repudiation of the infliction of pain and prolonged suffering. For instance, the failure of cancer research based on experiments on animals to prevent the increase of the disease or to yield adequate curative treatment is claimed by anti-vivisectionists as a strong argument in their favour. The early A. movement of the middle 19th cent. drew public attention to the cruelty of certain experiments carried out on animals by physiologists like Majendie Schiff, Claude Bernard, and others; and members of the medical profession, such as Dr Anna Kingsford, Dr Elizabeth Blackwell, and the distinguished surgeons Lawson Tait and Bigelow, were prominent in condemning the laboratory practices complained of and received the support of outstanding figures in literature, art, and religion.

A. societies were organised in Britain and other countries, and Brit. societies—still active—included, the National A. Society, the Brit. Union for the Abolition of Vivisection, the Animal Defence and A. Society, the Scottish Society for the Prevention of Vivisection, and the Manchester Society for the Protection of Animals from Vivisection. There has been an enormous increase in experimentation in recent times owing to the widespread use of animals for the testing and standardising of drugs, sera, and vaccines. The first royal commission on vivisection was appointed in 1875 and issued its report in the following year. This resulted

in the passing of the Cruelty to Animals Act of 1876, which made it obligatory for experimenters to hold licences and certificates, and legislated for a certain amount of inspection and for the issue of ann. returns by the Home Office. The second royal commission, which was appointed in 1906 and pub. its report in 1912, strongly held that limits should be placed to animal suffering in the search for physiological or pathological knowledge.

The Animal Defence and A. Society has co-ordinated medical opposition to vivisection by the foundation of associated medical bodies, by pub. of numerous articles by members of the profession and by stressing the constructive side of the movement. It has drawn public attention to methods of prevention and cure of disease not associated with experiments on animals, i.e. homoeopathy, nature cure, herbalism, physiotherapy, hydrotherapy, and psychotherapy. For a comprehensive survey of the Brit. movement see E. Westacott, *A Century of Vivisection and Anti-vivisection*, 1949. See also VIVISECTION.

Antlers, outgrowths of the frontal bone found in male deer. The antler is attached by a bony ring, the 'burr,' to a pedicle, which in turn is joined to the skull. During growth the antler is covered by a sensitive, hairy skin, known as 'velvet,' which dries up and is rubbed off when maturity is attained. The A. are shed annually, and the number and complexity of the branches increase year by year. They occur, in various forms, in practically all kinds of deer, and are used for offensive purposes. The female reindeer is antlered as well as the male. A. with more than 12 points are seldom found in Great Britain, but heads of 60 points are in existence on the Continent. Shed A. are used commercially for handles of knives, umbrellas, etc.

Antlia Pneumatica, 'Air-Pump,' constellation in the S. hemisphere, named by Caccille in 1752. Sigma Antliae is a variable star with a period of 7 hrs 47 min.

Antoecol, from the Greek, signifies 'those who live over against each other,' and is the name given to the inhab. of 2 places which have the same lat. and long., except that one place is N. of the equator and the other S. Those who live N. of the equator are A. to those who live S., and vice versa. Two antoecial places have the same hour of day or night, but opposite seasons of the year.

Antofagasta: 1. N. Chilean prov. between Tarapaca and Atacama provs. It is rich in saline deposits. The silver mines of Caracoles are about 90 m. NE. of the port of A. It produces for export silver, copper, lead, and salt. Chief tns are Taltal, Cobija (the old cap.), Tocopilla, Chugucamata, and A. (cap.). The prov. belonged to Bolivia, and was ceded definitely to Chile in 1882. Area 47,515 sq. m.; pop. (1952), 184,779.

2. Port, largest city in N. Chile, cap. of above prov. It is an important commercial centre, exporting nitrates and copper and other metals. The smelting

works for silver mines are located here. Pop. 62,272.

Antoine de Bourbon, Duke of Vendôme (d. 1562), Fr. prince, married, in 1548, Jeanne d'Albret, only child of Henry II, King of Navarre. Henry, Prince of Béarn, afterwards Henry IV of France, was the child of this marriage. A. assumed the title of King of Navarre in the right of his wife. He d. as the result of a wound received at the siege of Rouen.

Antokolski, Marc (1842-1902), Russian sculptor, b. Vilna. In 1864 he was admitted as a special student to the Academy of Fine Arts, St Petersburg, where he gained numerous medals. In 1871 the Emperor Alexander II bought his statue of 'Ivan the Terrible.' A. finally settled in Paris. Among his best works are 'Peter the Great,' 1872; 'Christ Bound before the People,' 1874; 'The Death of Socrates,' 1876; 'The Last Sigh,' 1878; 'Mephistopheles,' 1881; 'Spinoza,' 1882; 'Yermak,' 1900; 'The Sleeping Beauty,' 1900.

Antommarchi, Francesco (c. 1780-1838), Napoleon I's physician at St Helena, a native of Corsica, and a surgeon and anatomist of considerable repute. Napoleon left him a considerable sum of money. After serving as director of hospitals in the Polish revolution, he went to the W. Indies, and d. in Cuba. He wrote *Les Derniers Moments de Napoléon*, 1823.

Antonelli, Giacomo (1806-76), It. papal statesman, son of a wood-cutter from the vil. of Sonnino. After a brilliant career in the Grand Seminary at Rome, Pope Gregory XVI preferred him to various eccles. appointments. Pius IX made him a cardinal in 1847, and in 1848 president of the Liberal Cabinet which drew up the *Statuto* or Constitution.

Antonello da Messina (c. 1414-c. 1479), It. painter, b. Messina. He was a close follower of Flemish methods of painting, which he learnt from the Van Eycks and introduced into Italy. He acquired great renown in Venice as a portrait painter and a pioneer of the oil technique. His chief extant works are 'Salvator Mundi' and 'The Crucifixion,' both in the National Gallery, London, the portrait of an unknown man (Berlin Museum), and portraits at Dresden, Rome, Venice, and in the Louvre.

Antonescu, Marshal Ion, see RUMANIA. History.

Antonia Major, elder daughter of M. Antonius and Octavia, according to Suetonius and Plutarch, but Tacitus (*Ann.* iv. 44; xii. 64) speaks of her as the younger daughter. She married L. Domitius Ahenobarbus. Her son, Cn. Domitius, married Agrippina, and was the father of the Emperor Nero; her daughter, Domitia Lepida, was the mother of Messalina, afterwards married to the Emperor Claudius.

Antonia Minor (38 or 37 BC-AD 37), sister of the preceding, and the wife of Drusus Nero, the brother of the Emperor Tiberius. A. had 3 children, Germanicus, Livia, and the Emperor Claudius; she was noted for her beauty and her chastity.

Antonine Column, lofty pillar which stands in the Piazza Colonna at Rome. It was raised by Commodus in commemoration of the victories of Marcus Aurelius Antoninus over the Marcomanni and other Ger. tribes. The total height is 163½ ft, but the pedestal is disproportionate to the shaft. The capital is Doric, and the shaft is made of 28 blocks of white marble. A spiral interior staircase of 190 steps leads to the gallery on the top, which is surrounded by a balustrade. The exterior of the shaft is covered with bas-reliefs, representing the miracle of the Thundering Legion and the victories of Marcus Aurelius.



W. F. Mansell

ANTONELLO DA MESSINA

Self-portrait in the National Gallery, London.

Antonine Wall, earthen rampart and ditch, built to strengthen the line of fortifications already laid down by Agricola, constructed c. AD 140. The mound (*vallum*) ran from Bo'ness on the Forth to W. Kilpatrick on the Clyde, a distance of about 37 Eng. m. The width of the mound and ditch seems to have been about 25 yds; its depth from the top of the mound to the bottom of the ditch has been variously estimated at between 40 ft and 20 ft. It had in it between 10 and 20 fortresses with small watch-towers in between. A military road ran at the back of the *vallum*. It marked the N. limits of Rom. Britain.

Antonini Itinerarium, a register of stations and distances from Rome along the imperial roads and sea routes. The original ed. may be due to the Emperor Caracalla (211-17), but the extant portion is generally believed to date from the reign of Diocletian (284-305).

Antoninus Liberalis (2nd cent. AD), Gk grammarian. He is the author of a work entitled *Collection of Metamorphoses*. This collection is borrowed from a variety of authors, and is valuable as containing many passages of poets who are now lost. The best ed. is that of H. Verheyk, Leyden, 1774.

Antoninus Pius (AD 86-161), Rom. emperor, whose full name was **Titus Aurelius Fulvus Boionius Arrius Antoninus**. He was the son of Aurelius Fulvus, and was consul in 120. Adopted by the emperor Hadrian in 138, he succeeded him in the same year. A. P.'s reign was one of virtually unbroken peace. He was intelligent, experienced, humane, and in all things sincerely anxious for the welfare of his subjects. The provs. were well administered, legal reforms were instituted, art and science encouraged, fine buildings were erected, and the public welfare services improved. The title 'Pius' was conferred by the senate in recognition of the emperor's devotion to Hadrian's memory. A. P. died at Lorum in Etruria, leaving a daughter who was married to Marcus Aurelius.

Antonio, Prior of Carto (1531-95), was the natural son of Louis, younger son of Emanuel, King of Portugal. On his return from captivity in Morocco he claimed the throne of Portugal on the death of Cardinal Henry. He was opposed by Philip II of Spain, who had a much better claim, as had also the Duchess of Braganza. Being supported only by the peasantry, he was easily defeated, and fled to France and later to England, by both of which countries he was supported out of hostility to Spain. Expeditions fitted out by France and England alike failed, and he d. a disappointed claimant. See PORTUGAL, *History*.

Antonio, Nicolás or Nicolao (1617-84), Sp. writer, b. Seville. His most important work is *Bibliotheca Hispana*, a bibliography of Sp. writers from 1500 to 1664 (Rome, 1672, 2 vols., 2nd ed. Madrid, 1783), which is still an invaluable guide for Sp. literature.

António Enes, or Angoche, tn, riv., and coast dist. of Portuguese E. Africa. The dist. produces sisal, copra, beans, ground-nuts, cashew nuts, rice, and manioc which are collected and exported through A. E.

Antonius, Gaius, nicknamed Hybrida, second son of the orator and uncle of Mark Antony. As consul with Cicero in 63 BC, he was entrusted with the campaign against Catiline; but since he was unwilling to fight against his former friend and associate, he gave the command on the day of battle to his colleague M. Petreius. Appointed proconsul of Macedonia in 61, his extortions led to his prosecution when he returned to Rome in 59. Though defended by Cicero, he was found guilty and condemned to exile. Recalled by Caesar in 47, he is known to have been living in 42 BC.

Antonius, Marcus, the Orator (143-87 BC), son of Gaius A. In 99 BC he was the colleague of Aulus Postumius Albinus

in the consulship; and in the following year he defended M. Aquilius on a charge of extortion during the Servile war in Sicily. In 97 he was censor. He fell a victim to the fury of Marius and Cinna, when they took forcible possession of Rome (Plutarch, *Marius*, xlii). His eloquence is celebrated by Cicero in his *Brutus*, xxxvii, xxxviii.

Antonius, Marcus (d. 72-71 BC), eldest son of the Orator and father of Mark Antony. As praetor in 74 he was entrusted with an extraordinary command against the Mediterranean pirates. He took advantage of his authority to gratify his avarice, plundered the provs., and was heavily defeated by the pirates and their allies in Crete, thereby winning the derisive title Creticus.

Antonius, Marcus (Mark Antony) (c. 83-30 BC), the triumvir, son of A. Creticus. After serving with distinction under Gabinus in Syria (58-57) he joined Caesar in Gaul; quaestor 51; tribune of the plebs 49, in which capacity he vetoed the decree depriving Caesar of his command, was expelled from the senate house, and fled to Caesar's camp in Cisalpine Gaul. Throughout the ensuing struggle he was one of Caesar's most trusted supporters: deputy-governor of Italy in 49 and again in 47, second in command at Pharsalus (48). In 44 he was consul with Caesar, after whose assassination on 15 Mar. in that year he made a skilful but abortive attempt to gain supreme power. Checked by the arrival in Italy of Octavian (see AUGUSTUS), and defeated by the latter before Mutina, A. agreed to a reconciliation, and with Octavian and Lepidus (q.v.) formed a triumvirate in 43 BC. After the proscriptions, in which Cicero fell victim to A.'s lifelong hatred, A. and Octavian crushed the republican forces of Brutus and Cassius at Philippi in Macedonia. A. then went E., and met Cleopatra for the first time in Cilicia (41 BC). He was captivated by her charms, followed her to Alexandria, and there spent the winter in her company. His character had always been unstable, and from this time it rapidly deteriorated. But even the delights of Alexandria had to be postponed when news arrived that the Parthians had invaded Syria and that his brother Lucius, instigated by A.'s wife Fulvia, had fallen foul of Octavian. Hurrying to Italy, he found Octavian already victorious; Fulvia d. in 40, the triumvirs were again reconciled, and A. married Octavian's sister. He then returned to the E. and made several, though not altogether successful, attempts to subdue the Parthians. At this point he seems to have approached the borders of insanity; for while visiting Athens in 39 he assumed the attributes of the god Dionysus. Ambition, however, was not yet dead: A. travelled to Italy in 37, renewed the triumvirate, and returned to the arms of Cleopatra. But sensuality destroyed the last vestiges of self-respect. A. took upon himself to dispose of provs. and kingdoms in Cleopatra's favour, abandoning himself meanwhile to all the

pomp and indulgence of an oriental despot. The indignation of Rome would tolerate no more: in 32 the senate deprived him of his powers and declared war on the Egyptians. On 2 Sept. 31 BC the combined fleets of A. and Cleopatra were defeated by that of Octavian under M. Vipsanius Agrippa (q.v.) at the battle of Actium. A., deserted by his troops, returned to Alexandria where, like his paramour, he found a last refuge in suicide. See A. E. Weigall, *Life and Times of Mark Antony*, 1931, and J. Lindsay, *Mark Antony, his world and his contemporaries*, 1936.

Antonius Musa (fl. 10 AD), Rom. physician and a brother of Euphorbus. Is said to have been the first to recommend the use of cold baths, and treated the Emperor Augustus for gout by this means. His patients also included Virgil, Horace, Maecenas, and Marcus Agrippa.

Antonomasia (Gk *anti*, instead of; *onoma*, name) is the figure of speech by which the name of some famous character is used for the class he typifies, as in 'A Daniel come to judgment.' See also **FIGURE OF SPEECH**.

Antonov, military leader of a peasant anti-Communist movement in the Tambov prov. of Russia, 1919-21. A Socialist Revolutionary (see **SOCIALIST REVOLUTIONARIES**) since 1905, A. returned from banishment in 1917 and was chief of district militia (police). The uprising started by A. was joined by 50,000 peasants and deserters from the Red Army, who were organised in 2 armies. Political leadership was provided by the Socialist Revolutionary party through the Unions of Telling Peasantry headed by the Prov. Committee, which exercised the civil authority. A. suffered several defeats from gov. troops under Tukhachevsky, but the movement finally collapsed as a result of the New Economic Policy (q.v.).

Antony, Saint (AD 251-356), called the Great, was b. at Roma in Upper Egypt, and was the inaugurator of monastic life. He distributed his property among his neighbours and the poor, and retired to a wilderness near his native vil. He afterwards went farther into the desert, where he lived in solitude until 305, when he founded his first monastery in the Fayum, near Aphroditopolis. Seven of his letters, written originally in Coptic, but trans. into Lat., are extant in the *Bibliotheca Patrum*. In 1089, cures of the distemper called the 'sacred fire' were believed to have been wrought by his intercession. From that time it was called St A.'s fire, and in modern days erysipelas. His feast is on 17 Jan.

Antony of Padua, St (1195-1231), devoted follower of St Francis of Assisi, b. at Lisbon. In 1220 he entered the Franciscan order. He desired to devote himself to missionary labours, but being wrecked on the coast of Sicily he wandered through Italy, gaining a great reputation as a preacher. He is also revered as a wonder-worker and as a finder of lost articles. He was canonised by Gregory IX (1232); his feast is on 13 June.

Antrim, Randal Macdonnell, 1st Marquess of, and Earl of Dunluce (1609-83). Irish nobleman and royalist. Introduced to court, 1634, and created a marquess, 1643, on account of his (subsequently unfulfilled) promise to raise an army of 10,000 in Ireland for the service of Charles I.

Antrim: 1. Maritime co. of N. Ireland. The formation in the N. and E. is hilly, the interior sloping in the direction of Lough Neagh. The prin. elevations are Trostan, 1810 ft, and Slemish, 1782 ft. The prin. streams are the Bann, the Main, and the Bush. The coastline is distinguished by its basaltic rock formation, the Giant's Causeway being one of the finest specimens of columnar basaltic rock. Peat bogs are frequent in the interior. Salt, iron, and limestone are extensively worked, and there are coal-fields near Ballycastle. A. is the centre of the Irish linen manuf. The other staple industries are agriculture (flax, oats, and cereals), and the manuf. of cotton and wool. It has important coast fisheries. The co. returns 7 members to the Parliament of N. Ireland and 2 to that of Great Britain and Ireland. The predominant form of religion is Presbyterianism, an effect of the Scottish colonisation. Catholics are also numerous. Area 1090 sq. m., of which about one-third is under cultivation. Pop. 231,000, exclusive of the co. bor. of Belfast.

2. Tn of co. A., 17 m. NW. of Belfast, picturesquely situated on Lough Neagh. Pop. 1700.

Antrum of Highmore, in anatomy, term applied to the maxillary sinuses, a cavity in the body of the upper jaw-bone, forming an accessory air cavity to the cavities of the nose (q.v.). The roof forms the floor of the orbital cavity.

Antsirane, seaport on the N. coast of Madagascar, on Diego-Suarez Bay, founded in 1855. With Diego Suarez, A. is an important naval base; the combined pop. is 15,000.

Antung, one of the chief ports of Manchuria, near the mouth of the Yalu R. It is a junction of the railway from Mukden and the Korean railway. Its industries include lumber milling, paper and match manuf., non-ferrous metal refining, cotton and silk weaving, and agric. processing. It also has ship repair yards. Pop. (1951) 310,000.

Antunnaacum, see **ANDERNACH**.

Antwerp (Fr. **Anvers**, Flem. **Antwerpen**): 1. prov. of Belgium, bounded on the N. and NE. by the Netherlands, S. by Brabant, SE. by Limbourg, and SW. by E. Flanders. It has an area of 1104 sq. m. and a pop. of 1,362,908 (1955).

2. Cap. of the above prov., on the R. Scheldt, 27 m. N. of Brussels. It is the chief seaport and commercial centre of Belgium. Excluding the suburbs, the area is 33.4 sq. m. and the pop. 256,000; including the suburbs (Berchem, Borgerhout, Deurne, Ekeren, Hoboken, Merksem, Mortsel, and Wilrijk) the area is 64.4 sq. m. and the pop. 547,000. The completion of the new docks has brought up the total quayage length to about

150,000 ft, making A. one of the largest ports in the world. In 1956, 15,000 vessels entered the port. The chief of its many manufs. are sugar, beer, spirits, soap, candles, tobacco, cigars, chocolate, biscuits, sewing-silk, chemicals, furniture, and textiles. It is also extensively engaged in the industries of shipbuilding, diamond-cutting, petroleum-refining, tanning, etc. Surrounded by two circles of fortifications, A. was considered before the First World War to be one of the most strongly fortified places in Europe. The city is exceptionally rich in treasures of architecture and painting. Amongst the



Belgian Embassy: Cliché C.G.T.
ANTWERP

most notable of these are the superb Gothic cathedral of Notre-Dame (1352-1543) with its 6 aisles, its famous chimneys, and Rubens's masterpieces 'The Descent from the Cross' and 'The Elevation of the Cross'; the church of St James (1491-1656) containing the tomb of Rubens and a beautiful altar-piece by the master; the Museum Plantin-Moretus, residence and workshop of this famous printer's family since 1520; Rubens House (reconstructed recently); the old castle Steen (10th cent.), and the Butchers' Hall (16th cent.), now historical museums; the Hôtel de Ville (1565) and the Exchange. The Royal Gallery of Fine Arts contains a fine collection of masterpieces of all ages and schools, comprising numerous pictures by Van Eyck, Memling, Massys, Rubens, Van Dyck, Jordaens, and many other Flem. painters. A. has had a varied and eventful hist. It appears to have been founded as a mkt tn by a Frankish tribe some time before the 8th cent. In the beginning of the 9th cent. A. was destroyed by the Northmen. The foundations of the Steen castle date from the

period when A. was rebuilt in the 10th cent. From the 11th cent. its importance increased steadily, but its commercial traffic was confined to local needs until the 15th cent., when, with the decline of Bruges, began the modern prosperity of A. In the 16th cent. it was the most prosperous city of N. Europe. It lost this position when religious quarrels divided the tn, and in 1576, 8000 of its inhab. are said to have been butchered and hundreds of buildings burned during the Sp. terror. The city was captured in 1585 by Alessandro Farnese, Duke of Parma, who sent all Protestant citizens into exile. In 1648 the Scheldt was closed by the treaty of Westphalia (q.v.). The city fell into the hands of the French in 1794. Napoleon I visited it in 1803 and took a great interest in its potentialities. He wished to make it a strong commercial and military centre, with special reference to its possible use against England. He ordered the construction of the 2 first docks and of new shipbuilding yards. From 1815 to 1830 as part of the kingdom of the Netherlands, A. received a new impetus from the trade with the Dutch colonies. During the 1830 revolution A. was stoutly defended by the Dutch general Chassé, but surrendered to the French in 1832, and was finally ceded to the Belgians, whose possession was confirmed by the treaty of 1839. In 1863 Belgium paid 36 million francs to obtain from the Netherlands the freedom of traffic on the Scheldt. From that time it steadily advanced in prosperity to its flourishing condition prior to the Second World War.

Siege of Antwerp (1914). While Liège was still holding out, King Albert on 12 Aug. decided to retire on A., so as to be in a position to attack the flank of the enemy advancing through the S. of Belgium into the N. of France. On 28 Sept. the Germans launched their attack against the A. stronghold by a direct advance on the Scheldt from the S. and S.E., the quarter in which the outer defence works of A. extended 9 m. along the crescent formed by the riv. and its tribs. In a few days, one by one, the main forts were put out of action. The garrison took up a new position behind the Nethe r. Next day (3 Oct.) a Brit. marine brigade 2200 strong and 2 Brit. naval brigades with 6 heavy guns arrived. Repeated enemy attempts to cross the riv. were repulsed between 3 and 5 Oct. with heavy loss, but on 6 Oct. the Belgian line was pierced. The whole Belgian force and the Brit. marines then fell back within the inner forts to make a final stand. The successful withdrawal of the army began in the same night, the great oil-tanks of the port having previously been destroyed to prevent capture. About 200,000 inhab. crossed the Dutch frontier. Three battalions of the 1st Brit. Naval Brigade were also compelled, through not having received the order to retire, to enter Holland and so were interned. The tn was formally surrendered on 10 Oct. As a result of the fall of A. Ostend and Zeebrugge were evacuated and the

Belgians took up fresh positions on the Yser.

Antwerp in the Second World War. The Germans entered A. on 18 May 1940, remaining in occupation until 1944, when the town was liberated by the Brit. advance. The 11th Brit. Armoured Div. entered the city on 4 Sept. after a daring drive northwards of 110 m. in 8 days. The undamaged, well-equipped port was a valuable weapon in the hands of the Allies. The Germans offered some resistance just N. of A. on the Albert Canal until 4 Oct. From 13 Oct. until the end of March 1945 the city was subjected to incessant flying-bomb and rocket attacks, causing much loss of life and damage; but this did not interfere with the working of the port and the moving of military supplies, which began to reach A. on 28 Nov. after the complete liberation of Walcheren at the mouth of the Scheldt.

The Albert Canal, linking Liège with A., was completed in 1939. It figured prominently in the fighting for the relief of the Low Countries in 1944.

Antyllus (c. 150 AD), Gk surgeon. Much of his writing is available to us only through the industry of Oribasius (q.v.), who included it in his compilations, but he is considered the greatest surgeon of antiquity. His most daring operation was the treatment of aneurysm by tying the artery on each side and excising the aneurysm. He gave precise directions for many individual operations on the eye, abdomen, breast, bones, and joints; he wrote on plastic repair of the eyelids, nose, ears, and cheeks, and he employed the cautery for controlling haemorrhage. A Lat. trans. of his fragments was pub. in 1842.

Anu, head of the prin. Sumero-Akkadian triad of deities (with Enlil and Ea, q.v.), father and king of the gods. As 'The High One' A. was thought to be god of the air and atmosphere and thus of the heavens. His consort was Antum ('Anat) and the prin. seat of his worship was Erech (q.v.). The attributes of A. were largely transferred to the later Assyrian national god Ashur (q.v.).

Anubis, early Egyptian deity, originally a dog, so usually represented with the head of a dog. Always a god of the dead and protector of burials. He attended the weighing of the heart, and was chief embalmer of Osiris (q.v.).

Anura, the order of tailless Amphibia consisting of about 1500 species of frogs and toads. There are two suborders, the Phaneroglossa, the tongued-species and the Aglossa, tongueless species. The only members of the latter suborder are the Pipidae, such as the Surinam toad.

Anuradhapura, or **Anuradha**, tn, Ceylon, 80 m. N. of Kandy. From the 5th cent. BC to the 8th cent. AD it was the cap. of the is. It possesses the famous bo-tree, which is supposed to have sprung from the tree under which Gautama was transformed into Buddha.

Anus, external termination of the rectum, or opening of the lower end of the alimentary tract. The aperture is closed, except during the act of defecation, by

the external and internal sphincter muscles. A congenital closure of the rectum by an imperforate A. is sometimes met with in infants, but can usually be remedied by surgical operation. Other affections of the part are spasm of the sphincter muscle, ulceration or fissure of the A., pruritus ani, characterised by intense irritation. The usual treatment consists of strict attention to cleanliness and the use of suitable ointments.

Anville, Jean-Baptiste Bourguignon d' (1697-1782), Fr. map-maker and geographer, b. Paris, and became geographer to the king. His maps and studies in anc. geography are still used. His chief pub. are the *Atlas général*, 1737-80, and the *Atlas Antiquus Major*, with its 3 vols. of *Géographie ancienne*, 1769.

Anwari (fl. 12th cent. AD), court poet of Sanjar, ruler of Persia (1117-57). He was a master of the *qasida* ('purpose-poem' or elegy). He was also an astrologer of some repute. A poem of A. is trans. by W. Kirkpatrick in *Asiatic Miscellany*, vol. 1 (Calcutta, 1785), under the title 'The Tears of Khorasan.'

Anxanum, see LANCIANO.

Anxiety States (Anxiety Neurosis, etc.), are a form of psycho-neurotic reaction characterised by morbid or pathological anxiety. They are the commonest of all the psychoneuroses and fortunately the most amenable to treatment. While the patient may frequently ascribe his condition to some trifling situation or environmental difficulty, the picture as thus presented will be clearly illogical, for the emotional reaction will be obviously out of all proportion to the alleged cause. The real stress or conflict is endopsychic, though the patient may be unaware of its existence or at least of its connection with his symptoms. According to Freud the basis of anxiety neurosis is always in the sexual life, but this theory is not universally accepted. Among the predisposing causes may be included a morbid heredity, a morbid family environment (e.g. maternal anxiety), and an emotionally unstable, timid, worrying type of personality. Any type of external stress (e.g. fear, frustration, or failure in the domestic, financial, sexual, or other sphere), may serve as a precipitating factor. Freud distinguished 2 types of anxiety state: (1) anxiety neurosis and (2) anxiety hysteria. The former term he applied to the type of case in which the anxiety is experienced primarily in the mental field, and the latter to conditions in which somatic manifestations constituted the most prominent feature. This classification, however, is liable to lead to some confusion and is not by any means universally accepted or used. The symptoms of anxiety states may be both very numerous and very varied. The mental symptoms include fears of all kinds, from vague inexplicable states of tension and apprehension to specific phobias, in which the fears have become focused on or attached to various objects and situations, and secondary to these fears, irritability, depression, excitability, difficulty in concentrating, faulty memory, intolerance of noise, etc.

The somatic symptoms may be referred to any one of the bodily systems, and frequently it is with them that the patient is mainly preoccupied and because of them that he first seeks advice. Palpitation, hyperpnea, dyspnoea, dyspepsia, constipation, diarrhoea, tics, tremors, pains of various kinds, and easy fatigability are only a few of the very many forms in which psychosomatic anxiety may manifest itself. Treatment in the first place demands that the patient should be firmly reassured regarding his physical health, and he must be helped to accept such reassurance by a thorough investigation of his physical condition. The true cause of his symptoms is then sought by psychiatric examination and explained to him. Since all psychoneurotic reactions are, to some extent, defence mechanisms against some unpalatable truth, it is not surprising that the most difficult part of the treatment frequently lies in overcoming the patient's 'resistance' to accepting the explanation. (See also PSYCHONEUROSIS.)

Anxur, thriving tn of the Volsci, long before the Rom. Conquest, situated in Latium. It was taken by the Romans 403 BC (Livy, iv. 59), retaken by the Volscians, 399 BC (Livy, v. 8), and again taken by the Romans 396 BC (Livy, v. 13). It afterwards became a Rom. colony (Livy, viii. 21), under the name of Terracina, or Terracina (q.v.).

Anyang (Changteh), Chinese city in the N. part of Honan prov. on the Peking-Hankow railway, S. of R. Yuan. It was the old capital of the Shang Dynasty up to the 12th cent. BC. During the Three Kingdoms period (216-63) it was the cap. of Wei. In 1899 a great number of oracle-bone inscriptions, the earliest Chinese writing extant, were recovered from the tombs of the Shang kings (see CHINESE LITERATURE). A. has since been frequented by archaeologists of many countries.

Anytus, wealthy leader of the Athenian democrats, and son of Anthemion. With Thrasylbus he helped to overthrow the Thirty Tyrants. He was the most powerful of the accusers of Socrates (399 BC), and the Athenians, on repenting of the latter's death, sent A. into exile.

Anzacs, the Australian and New Zealand Army Corps which served in the First World War, the word being formed of the initial letters of the corps. The Anzacs' most conspicuous service was rendered in the ill-fated Gallipoli campaign of 1915. The Corps effected a heroic landing under intense difficulties at Gaba Tepe, later named Anzac Cove in memory of the exploit (25 April 1915, 'Anzac Day'). (See also GALLIPOLI CAMPAIGN.) After the evacuation they fought in Macedonia, on the Salonika front, in Egypt, and in France. In Egypt a number of A. formed the force which, under Sir Charles Dobell, attacked the Turks at Gaza (1917). In France they fought with characteristic dash in the Somme battle, 1916, notably at Pozieres. **Anzengruber, Ludwig** (1839-89), Austrian dramatist and novelist, b. Vienna.

His best work, mainly dealing with peasant life, was produced after 1867. His anti-clerical play, *Der Pfarrer von Hirschfeld*, made him famous in 1870, and was followed by *Der Meiseldbauer*, 1871, *Die Kreuzelschreiber*, 1872, *G'wissenssurm*, 1874, *Das vierte Gebot*, 1878, and *Aus'm gewohnten Gleis*, 1880. His most original work is his realistic novel *Der Sternsteinhof*, 1885. His collected works were first pub. in 1890, and a biography by A. Bettelheim in the same year.

Anzhero - Sudzhensk, tn in the Kemerovo oblast of S. Siberia, 45 m. N. of Kemerovo, on the Trans-Siberian Railway. It is a major centre of coal-mining in the Kuznetsk Basin; mining equipment is manuf. Pop. (1956) 116,000 (1913, 15,000; 1936, 100,000; 1939, 71,000). Founded 1896; tn since 1930's.

Anzin, Fr. tn in the dept of Nord, a suburb of Valenciennes, on the Scheldt. It is an important coal-mining centre, and has machinery manufs. and metal industries. Pop. 14,000.

Anzio, Porto D' (anct Antium), It. port, in Lazio (q.v.), on the Tyrrhenian Sea, 33 m. S. of Rome (q.v.). It has been a popular resort since the time of the Romans (see ANTIUM). The modern tn dates from the restoration of the harbour in 1698. Pop. 12,600. The A. and Nettuno (q.v.) beachhead formed an important subsidiary front in the Allies' campaign against the Germans in Italy in the Second World War. An apparent deadlock on the Ger. defensive line between the Apennines and the sea was resolved by the surprise landing of a strong detachment of the Fifth Army behind the Germans' flank at A. and Nettuno (22 Jan. 1944). The bridgehead thus estab. at the extreme range of allied support by fighter aircraft, was heavily counter-attacked and the defenders passed through a precarious phase, but held out until, on 18 May, other allied troops stormed Monte Cassino (see CASSINO, BATTLE OF), and burst through the Gustav line to effect a junction with them. See ITALIAN FRONT, SECOND WORLD WAR CAMPAIGNS ON.

Aomori, see AWOMORI.

Aorist (Gk *aoristos*, indefinite), the Gk tense used to express indefinite past time, i.e. unlike other past tenses it denotes a simple past occurrence without specification of completion, continuance, etc. It corresponds to the Eng. past tense, 'died,' 'went,' 'did,' and is especially suitable for the narrative style. The distinction between first and second A. was not observed in practice.

Aorta, large blood-vessel leading from the left ventricle of the heart and sending arterial blood to all parts of the body. It descends through the thoracic and abdominal cavities, lying in front of the vertebral column, and ends by bifurcating into the common iliacs at the level of the fourth lumbar vertebra.

Aosta (anct Augusta Praetoria Salas-sorum), It. city, cap. of the region of Valle d'A (q.v.), on the Dora Baltea, 370 m. NW. of Rome (q.v.). It stands in the beautiful A. valley, surrounded by

mts, and has a cathedral (12th-19th cents.) and impressive Rom. remains, including an arch of Augustus, walls, a three-arched gateway, and an amphitheatre. It was the bp. of St Anselm (q.v.). There are iron and steel industries, and there is a tourist trade. Pop. (tn) 13,500; (com.) 23,600.

Aoudad, see BARBARY SHEEP.

Apaches, formerly a fierce and predatory tribe of N. Amer. Indians of the S. Athabascan linguistic family, inhabiting parts of N. Mexico, Arizona, and Texas. At one time very numerous, they have been largely exterminated, chiefly in the numerous and fierce wars they fought with the Spaniards and the white Americans, and now number about 6000. The name *apache* has more recently been applied to the criminal type of Paris.

Apafi, family whose members were princes of Transylvania, the most notable being Michael I (1632-90). He was chosen prince in 1661 and remained faithful to the Sultan, under whose protection he reigned till after the siege of Vienna in 1683. In 1687 he obtained a declaration of Transylvanian independence under Hapsburg protection by a treaty with the Emperor, Leopold I, and under his son, Michael II (1677-1713), Transylvania was incorporated with Hungary (1699).

Apalachicola: 1. Riv. of Georgia and Florida, U.S.A. The A. has 2 main branches, the Chattahoochee and the Flint, which rise in Georgia and meet at the extreme SW. of the state, and that part which then flows 112 m. through Florida into the A. Bay is called the A.

2. City and port of Franklin co., Florida, U.S.A., on riv. and bay of same name. Noted for oyster, tarpon, and other fisheries. There is a monument to J. W. Gorrie, the physician, who discovered the cold-air process of refrigeration. Pop. 3222.

Apanage, see APPANAGE.

Aparrí, port of Cagayan prov., Luzon, Philippines, on estuary of Cagayan R., the only serviceable harbour on the N. coast of the is. Pop. 24,974.

Apartheid, coined word meaning 'separatism, or 'being kept apart,' used to describe the general nature of the S. African Gov.'s policy towards the various racial groups in S. Africa. The guiding principle behind the policy is that the less developed non-whites, especially the Bantus, should be guided by the whites towards self-realisation and self-gov. within their own communities and in their own areas. It is planned to give the Bantu full rights, in their own sphere, as and when they become capable of exercising them, and to teach them to shoulder the duties and responsibilities which accompany the rights and powers of self-gov. The Bantu's ambitions will be directed into the framework of his own Bantu society, so that as he progresses he will not abandon his people in order to penetrate the white man's society or to participate in the latter's institutions of gov. The A. policy aims at giving him ample opportunities for

the service of his people. While total and absolute segregation may be the ideal of extremists, it is accepted by all serious thinkers in S. Africa that complete segregation is neither practical nor desirable. A. is based on S. Africa's traditional policy of separate or parallel development of the races. See also COLOUR BAR; SOUTH AFRICA. UNION OF.

Apartment, see FLAT.

Apathy (Gk *a*, privative; *pathos*, affection) The Gk doctrine of A.—unruffled tranquillity of mind as a virtue—is generally associated with the Stoic school of philosophy. Yet it is really much earlier and there are clear indications of it in the Cynic school. Democritus describes human happiness in the same way as A. is described by later philosophers. This idea is in accordance with the general feeling of the Hellenistic period, which was always ready to recognize the happiness of the individual as existing in a kind of quietism. But this extreme view found opponents in Plato and others. Plato always deliberately opposed A. and later philosophers are strongly influenced by the more moderate attitude. In the eyes of the Neo-Platonists—especially Philo—A. appears as the highest stage of virtue. Modern psychologists describe A. as visceral anaesthesia. James argues that emotional A. keeps pace with sensory anaesthesia, assuming that a subject absolutely anaesthetic could experience no emotion. This—the James-Lange theory of emotion—is, however, opposed by others. See J. Ward, *Psychological Principles*, 1920.

Apatite, mineral, very widely distributed, which consists mainly of phosphates of calcium. Most varieties correspond to the formula $3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{CaF}_2$ or $\text{Ca}_3(\text{PO}_4)_2 + \text{Ca}_3(\text{PO}_4)_2\text{F}$, but sometimes the fluorine is replaced by chlorine. It crystallises in a hexagonal form, and crystals are sometimes found over a foot in length. When found in large masses, as in Norway and Canada, it is mined for the extraction of phosphates. It is always a constituent of gneiss, granite, and diabase, usually in minute crystals, and probably the phosphates in the soil are due to A. from the disintegration of such rocks.

Ape, term used to denote (1) the anthropoid A.s (q.v.), the short-tailed or tailless A.s, and monkeys (q.v.) and baboons generally; (2) more specifically, the most man-like forms, such as the chimpanzee, the orang, the gorilla, and the gibbons.

Apeldoorn, tn in the prov. of Gelderland, Netherlands, 17 m. NNE. of Arnhem. Manufs. paper extensively, also blankets and woollen cloth. In the neighbourhood is the 17th-cent. Castle Loo, the royal hunting-lodge. Pop. 94,740.

Apella, Spartan assembly of freemen. It was composed of all citizens of 30 years of age and over. It was convened once a month between the bridge of Babyca and the Cnacion, the ravine of the Oenus. As the anct Homeric Agora had only been

able to shout its assent or dissent, so the A., though assigned a real part in the constitution, could only vote by acclamation. Before the A. were laid the subjects approved by the Gerousia (the council of elders). Declarations of war, treaties of alliance, depositions of kings, etc., were within its cognisance. No one could speak in it without the invitation of the president—a feature also to be found in the Rom. Comitia. In historic times the ephors presided.

Apelles, Gk painter of the 4th cent. bc, b. Colophon in Ionia. He studied at Sicyon, near Corinth. Becoming a favourite at the court of Philip of Macedon, he was appointed by Alexander to be his portrait painter. As none of his works now remains, it is impossible to judge them other than by reputation, but anecdote suggests a realistic power of suggesting three-dimensional effect, e.g. in his 'Alexander wielding a Thunderbolt,' where the hand according to Pliny seemed to come out of the picture. His 'Aphrodite Anadyomene' was one of his famous works. He wrote a (vanished) treatise on his art, and was renowned for his skill in using only four pigments: white, yellow, red, and black.

Apellicon (1st cent. bc), according to Strabo a native of Teos, but he was admitted as a citizen of Athens. He was a Peripatetic philosopher, and a great collector of books. He purchased the autograph MSS. of Aristotle and Theophrastus; but his entire collection was taken to Rome by Sulla after the capture of Athens in 86 bc.

Apennines (Lat. *Appenninus*), long mt range, often called the 'backbone of Italy.' Starting from the Maritime Alps (q.v.), the A. run 740 m. down the whole length of the peninsula, and are continued through Sicily, beyond which a line of submarine elevations connects them with the mts of N. Africa. Their name is probably derived from the same root *pen* which is found so frequently in Celtic lands (as in Penmaenmawr). Though spoken of by early writers as a single range, the A. are now generally classed as N., Central, and S. The N. div. includes the Ligurian, Tuscan, and Umbrian ranges, of which the first runs round the Gulf of Genoa (q.v.), from the Maritime Alps to the valley of the Magra, near Spezia. Its highest point is Monte Bue, 5915 ft. Between the Maritime and Ligurian mts and the sea lies the narrow strip of coast known as the Riviera (q.v.), while on the N. they sent off many tribs. to the Po. The Tuscan A., reaching across the peninsula to the sources of the Tiber, are slightly higher than the Ligurian, Monte Cimone rising 7103 ft. A spur on the W., called the Alpi Apuane, supplies very fine marble, at Carrara (q.v.). The chief rivs. of the Tuscan range are the Arno on the S., and the Panaro, Secchio, and Reno on the N. The N. end of the Umbrian range gives rise to 2 rivs. famous in hist., the Tiber and the Metaurus (q.v.), which rise within a few m. of each other, but flow into different seas. The S. extremity of

the range is not easy to define, as it becomes complicated with the great mass of the Central A. These, the loftiest in the peninsula, are broken up into sev. chains, of which the Gran Sasso (q.v.) has Monte Corno, 9580 ft, and Monte Amaro, 9170 ft, while the Sibillini and others have sev. peaks of 7000 and 8000 ft. The S. A. are very irregular, their chief ranges being the Matese (with Monte Miletto, 6725 ft), the Lucanian (Monte Pollino, 7325 ft), and the Calabrian. In these last, as in the Apuan dist., granite, gneiss, and other anct rocks are predominant; elsewhere the whole system is mainly of Triassic and later formations, a great part being limestone. The A. are not metalliferous, but furnish valuable stone. On the W. there are many traces of volcanic agency, but the only craters now active are those of Vesuvius, Etna (q.v.), and Stromboli. The highest peaks of the A. are covered with snow during a great part of the year, but there are no glaciers. In former times there were large forests of pine, oak, chestnut, and beech, containing many wild animals, but much of the timber has been felled, and only wolves are now troublesome, though a few bears still remain. Much more dangerous were the brigands who flourished, especially in S. Italy, down to very recent times.

Apennines, Lunar, extensive mt range similar in some respects to terrestrial features and visible to the naked eye when projecting into the dark part of the disk. It is 460 m. long and the highest summit, Huyghens, is 18,000 ft high.

Apenrade, Denmark, see AABENRAA.

Aperients, medicines which stimulate the natural action of the bowels. Sometimes the term is applied only to those milder purgatives which only slightly quicken the movement of the bowels. In the wider sense they may be divided as follows: (1) laxatives, which have a gentle stimulating influence on the bowel muscles, as figs, prunes, olive oil, etc.; (2) purgatives, which increase the movements of the intestines, and mildly stimulate the glands, as castor oil, aloes, etc.; (3) drastics, which act more intensely, increase the intestinal fluid, and cause painful fluid motions, as jalap, podophyllin, and large doses of purgatives; (4) hydragogues, which cause free secretion from the intestinal glands, and cause watery motions, as croton oil and large doses of cream of tartar, Epsom salts, Glauber's salt, etc.; (5) cholagogue purgatives, which stimulate the liver and increase the bile, producing greenish liquid motions, as aloes, rhubarb, iridine, etc.

Apetalous Plants are those in which the corolla is suppressed.

Apex Beat, stroke of the A., or point, of the heart against the pericardium, through which it can be heard and felt externally on the wall of the chest just below the left breast. Deviations in the position or force of this beat afford important indications of pathological changes in the heart.

Aphasia, partial or complete loss of the power of speech or of expression by writing, or of understanding spoken or written words. The term is not applied when the power is lost through lesions of the peripheral nerves or organs, but only when the central nervous system is affected. The memory-stores which enable us to use and understand the language we have so gradually acquired correspond with certain portions of the brain, and a consideration of the process of acquiring the power of speech will go far to explain why A. is so often restricted to certain functions connected therewith, while others remain intact. The child understands words before he can speak; these percepts are stored away in the brain in the first temporal convolution of the left-hand side in right-handed persons, and vice versa in left-handed persons. Later, the child learns to make the co-ordinated movements of the tongue, larynx, etc., necessary to pronounce a word. The memories of these movements are stored away in the foot of the third left frontal convolution. When he learns to read, the visual memories of the words are stored in the cerebral cortex, and so on. In health, there is constant communication between these portions of the brain, so that the image of a written word calls up the memory of the spoken word and of the movements necessary to give it utterance. If a lesion in any one of these areas occurs there is a corresponding loss of power of expression or understanding. Thus the patient may recognise a word when seen, but be unable to pronounce it; or may be able to pronounce it, but not recognise the sound when uttered, and so on. The condition sometimes improves of itself as the lesion heals, but it often happens that the patient has to learn all over again, as a child does, the art of speaking, reading, or writing, whichever has been lost.

Aphelion, position in the orbit of the earth or any other planet or a comet when it is farthest away from the sun. The orbit of the earth's revolution is an ellipse, with the sun in one of the foci. Thus the earth is at varying distances from the sun as it moves round in its orbit. It is nearest about 4 Jan., when the earth is moving its fastest; and farthest about 4 July when the earth's speed in its orbit is a minimum. The first position is called *perihelion* and the latter *aphelion*. (See **APSIDES**; **PERIHELION**.)

Aphemia, inability to articulate words from disease of the cortical speech centre and not of the peripheral nerves or organs. See **APHASIA**.

Aphides (plural of *aphis*), family of plant-lice belonging to the order Hemiptera, very common in Britain. They are characterised by their soft and oval bodies, small heads, jointed beaks, antennae of 7 joints, wings (when present) transparent and 4 in number. They feed on plants and from their food form an excretion, known as *honey-dew*, of which ants are very fond; in warm weather it may be seen like a coating of

varnish on leaves, where it is injurious to the plant.

The A. reproduce parthenogenetically and viviparously. In the early summer the unfertilised females may produce as many as 25 females alive in one day, and as these can also produce in a few days, their numbers increase enormously. In the autumn males begin to appear as well as females, and after mating the female produces a *winter-egg*, which in the spring develops into a female *aphis*—and again the cycle of generations begins. If it were not for birds, spiders, parasites, and ladybirds which prey on the A., probably all vegetation would be destroyed.

Aphis is the commonest type in Britain, but other well-known genera include *Phylloxera*, or vine-louse; *Nectarophora*, green pea-plant louse; *Phorodon*, or hop-plant louse; and *Chermes*, which produces galls on spruce firs. See G. B. Buckton, *Monograph of the British Aphides*, 1876-1883, and J. Davidson, *List of British Aphides*, 1925.

Aphis-lion, or lace-wing fly, is a member of the Chrysopidae, order Neuroptera, which feeds on the aphides. The genus *Chrysopa* is common in Britain.

Aphonia (Gk *a*, without; *phōnē*, sound), medical term to denote loss of voice; it differs from mutism in which sufferers frequently utter inarticulate sounds. Growths in the larynx, paralysis of the respiratory muscles, disease of the vocal cords, hysteria, and nervous disorders may all cause the malady.

Aphorism (Gk *apo*, from; *horos*, limit), short pithy saying conveying a general truth. The word was first used of the *Aphorisms* of Hippocrates, the first of which is 'Life is short, the art [of medicine] is long.' A proverb (q.v.) is an A. which has become universally accepted.

Aphrodite, Gk goddess of love, beauty, and fertility; frequently worshipped also as the patroness of seafarers and of war. She probably reached Greece from Cyprus, a common meeting place of E. and W.; for she is undoubtedly related to the Semitic Ishtar, Ashtoreth, and Astarte, and seems to have absorbed certain traits of pre-Hellenic divinities. In classical Rome she was identified with Venus. In the *Iliad* A. is represented as the daughter of Zeus and Dione; but later poets frequently relate that she was sprung from the sea-foam, whence they derive her name. She was the wife of Hephaestus; but she proved faithless and was in love with Ares (q.v.). She also loved the gods Dionysius, Hermes, and Poseidon, as well as the mortals Anchises and Adonis (qq.v.). A. surpassed all the other goddesses in beauty, and hence received the prize of beauty from Paris. She likewise had the power of granting beauty and invincible charm to others. In the vegetable kingdom the myrtle, rose, apple, poppy, etc., were sacred to A., as, in the animal world, were the sparrow, dove, swan, and swallow. Her chief shrines were in Cyprus and Cythera.

Aphroditopolis, see **ATFII**.

Aphthae (Gk *aphthai*, eruption), small

white vesicles in the mouth occurring chiefly in infants, commonly called *thrush*. See THRUSH.

Aphthonius (fl. c. AD 400), Gk rhetorician, b. Antioch; a pupil of Libanius (q.v.). His *Progymnasmatia*, an introduction to the study of rhetoric, was in common use for a thousand years. It has been ed. (1926) by H. Rabe, who also pub. (1928) the Byzantine commentary thereon by John Sardian.



Anderson

APHRODITE: CNIDIAN VENUS

Statue after Praxiteles in the Vatican.

Apia, seaport on the N. coast of Upolu, W. Samoa, cap. until 1914 of Ger. portion, but assigned to New Zealand under mandate by the treaty of Versailles. It is built on a curving bay, backed by a conical hill, Vaea, the burial place of Robert Louis Stevenson, beyond which rise the slopes of the high mt range. Copra and cocoa beans are exported. Under the mandatory administration the sanitation of A. has been greatly improved. There is a water supply, sewerage system, hydro-electric plant with electric lighting, and other modern conveniences. The tn has 2 motion picture theatres, sev. transport companies, engineering works, and other business enterprises. There is a high-power wireless station. Foreign consulates were set up in A. in the eighties of last century, a step which so exacerbated the traditional rivalry among the native clans as to lead to a dangerous crisis, and Britain, America, and Germany sent

warships to A. (1889). In Mar. of that year 4 Ger. and Amer. warships were sunk by a hurricane, and only H.M.S. *Calliope* escaped destruction. In 1899 there was a recurrence of the frequent trouble over the kingship question, when Mataafa, a Catholic exile, opposed Malletoa, youthful son of the late king. Britain and America favoured Malletoa, and when this led to a crisis Brit. and Amer. warships bombarded A. Pop. of urban dist. 14,840, inclusive of 3000 non-Samoans. See Felix M. Keesing, *Modern Samoa*, 1934, and R. Gibbins, *Over the Reefs*, 1948.

Apian, Peter (1495-1552), astronomer and astrologer, b. Leipzig. His real name was Bienewitz. *Biene* in German signifies a bee, whence the Lat. *apianus*, the full form of his name. He is principally remarkable for his observations of comets, and is said to have been the first who observed that their tails are generally turned from the sun; but this had been previously noticed by Fracastoro. In his *Cosmographicus Liber*, pub. in 1524 and subsequently revised by Gemma Frisius under the title *Cosmographia*, he pointed out the use which might be made of lunar observations in finding long.; he d. at Ingolstadt, where he was prof. of mathematics.

Apiary (Lat. *apis*, bee), place for keeping beehives. The name is derived in the same way that an aviary is taken from *avis*, a bird. Bee-keepers disagree as to the best position of the A., but all maintain it should be impervious to winds.

Apicius, name of 3 celebrated Rom. gluttons. The first lived c. 92 BC; the second c. AD 14; and the third about the middle of the 1st cent. AD. The second, M. Gavius A., is said to have invented sev. kinds of cakes and sauces. Having squandered a fortune in gluttony, he committed suicide. The extant *De Re Coquinaria*, wrongly attributed to one Caelius A., is a work of the 3rd cent. AD based on Gk originals.

Apion (1st cent. AD), Gk grammarian and head of the Alexandrian school, b. at Oasis in Libya. He was a member of Philo's deputation which visited Caligula in AD 38 to complain of the Jews. Fragments of his books against the Jews have been preserved by Josephus (*Contra Apionem*). A's story of 'Androclus and the Lion,' from his *Aegyptiacae*, survives in Aulus Gellius (*Noctes Atticae*, v. 14); and the extant fragments of his commentaries on Homer were printed in Sturz's *Etymologicum Gudianum* (1818).

Apis (Hapl), early sacred bull of Memphis. In the New Kingdom called a 'repetition of Ptah,' the chief god of Memphis, and after death so closely associated with Osiris that he eventually merged with him into one deity, Serapis (Usar-hapi). From the New Kingdom the A. bulls when dead were mummified and buried in huge stone sarcophagi in a subterranean gallery known as the Serapeum, in the Memphite necropolis, Sakkarah. In the Saite period coffins often bear a representation of the A. bull transporting the dead to the tomb.

Apium, genus of plants belonging to the Umbelliferae, found in ditches in Britain, and nearly every part of Europe. *A. graveolens*, the only important species, is the celery and celeriac, of which there are sev. cultivated varieties.

Aplanatic Lens, lens which is free from spherical aberration. See ABERRATION.

Apneumatosi, see COLLAPSE, PULMONARY.

Apnoea, technical term for the suspension of breathing. It denotes the prevention of breathing owing to the presence of too much oxygen in the blood.

Apocalypse, lit. trans. a revelation, i.e. something disclosed only to a chosen person. The term is usually applied to the last book of the N.T., the A. of St John. In the A.V. and the R.V., however, the name the Revelation of St John the Divine is given to this book. There were, however, a multitude of earlier writings of this kind (beginning perhaps with Daniel) which, in the form of parables and prophecy, were supposed to reveal the end or the future state of the world. The apocalyptic literature despaired of the present, and put its whole trust in the deliverance and reward which was to be the guerdon of present sufferings and sorrow in a new age that would soon follow a catastrophic judgment and the end of the world. In the O.T. parts of Isaiah, Ezekiel, and Daniel are apocalyptic in character. Among the non-canonical Jewish apocalypses the Book of Enoch and the Psalms of Solomon are outstanding. In the N.T., besides Revelation, Mark xiii (and parallels in Matthew and Luke) is apocalyptic. We find also in Christian times a number of apocalyptic writings, which are outside the canon, among them the Shepherd of Hermas, and the Revelations of Bartholomew.

Apocalyptic Number, or 'the Number of the Beast,' is the mystical number 666 (see Rev. xiii. 18). There have been various interpretations of this mystery. In Greek and Hebrew the letters of the alphabet were used for numbers, and so 'the number of the beast: for it is the number of a man' was the value of the letters composing the name. The most generally accepted solution is 'Neron Kesar,' the Hebrew for the Latin 'Nero Caesar.' In anct Hebrew the vowels 'e' and 'a' are not represented, but 'o,' being a long vowel, is. The value of the letters N R O N K S R is therefore 50 + 200 + 6 + 50 + 100 + 60 + 200 = 666. Another interpretation has been made from the Gk word 'Lateinos,' meaning the Rom. Empire.

Apocatastasis, in the theological sense the extension of the kingdom of God over all the earth, i.e. the ultimate conversion of the whole world to the Christian faith.

Apocrypha: 1. *Of the Old Testament*, or *Deuterocanonical Books*, consists of 1 and 2 Esdras, Tobit, Judith, Esther additions, Wisdom of Solomon, Ecclesiasticus, Baruch, Song of the Three Children, Susannah, Bel and the Dragon, the Prayer of Manasses, 1 and 2 Maccabees. See also BIBLE.

2. *Of the New Testament*, numerous

unauthentic Christian or heretical writings of the early cents. From them we distinguish the perfectly genuine but uncanonical writings of the 1st and 2nd cents. which are now known as The Apostolic Fathers. Of the Apocryphal works proper we may mention the *Gospel* (c. AD 150), the *Revelation* (earlier than the Gospel) and the *Acts* (c. AD 200) of St Peter. To the last we owe the *Quo Vadis* story. The Gospel of St Thomas (2nd cent.) deals with the infancy of Christ, and gives accounts of the miracles of that period. The Acts of Paul (and Theda) are fragments from a work of about AD 160. The *Proterangelium of James* is a popular life of the Blessed Virgin Mary from about AD 150. *The Assumption of Mary* (c. 4th cent.) gives a legendary account of her death and resurrection. *The Letters of Our Lord and of Abgar* are a 3rd-cent. legend. We should also mention the *Agapha*, a collection of sayings attributed to Christ, not recorded in the N.T., some of which may be genuine. Indeed though the Apocryphal works are very untrustworthy and legendary, they may contain some true traditions. See M. R. James, *The Apocryphal New Testament* (trans.), 1924.

Apocynaceae, family of dicotyledonous shrubs or herbs, mostly tropical, with poisonous milky juice, about 1000 species. Leaves simple, opposite, flowers regular, 5-parted, ovary superior. Chief genera are *Adenium*, *Allamanda*, *Amsonia*, *Apocynum*, *Carissa*, *Cerbera*, *Echites*, *Nerium*, *Plumeria*, *Strophanthus*, *Tabernaemontana*, *Trachelospermum*, *Valsesia*, *Vinca*.

Apodes, scientific name for the eels, which form an order of the bony (teleost) fishes. They are soft-rayed fishes with an open duct to the swimming-bladder and with long dorsal and anal fins. In all living eels there are no pelvic fins. The order includes the fresh-water eels (Anguillidae), the moray-eels (Muraenidae), and the conger-eels (Congridae). See also EELS.

Apodictic (Gk *apodeiktunai*, to show forth), logical term applied to a conclusion which is necessarily true, i.e. the opposite of which is impossible.

Apogamy, the curious condition met with in some ferns, e.g. in *Dryopteris filix-mas*, the male fern. In this case the new fern plant arises directly as a bud from the prothallus without aid of sexual organs. In other cases *A.* is effected parthenogenetically, the new plant arising from an unfertilised oosphere. See also APOSPORY.

Apogee (Gk *apo*, from; *ge*, the earth), point in the moon's orbit which is most distant from the earth. The term is applied also to the sun's position when it is at its greatest distance from the earth. It is used when the geocentric point of view is adopted; from the heliocentric point of view it corresponds to aphelion (q.v.). See PERIGEE and PERIHELION.

Apolda, Ger. tn in the dist. of Gera, 28 m. WNW. of Gera (q.v.). It has textile, machinery, bell-casting, and chemical industries. Pop. 33,500.

Apollinaire, Guillaume (1880-1918), Fr. writer, b. Rome. His real name was Wilhelm Apollinaris de Kostrowitzky, being the natural child of a Polish woman and a priest of Monaco. He wove legends on his early years, and all that is certainly known of him is that he had travelled much before he came to Paris in 1902. He was the chief protagonist of Cubism. He conducted a regular dept in the famous Fr. magazine *Mercur de France*. When the First World War broke out he served at the front, and d. of his wounds. He wrote fantastic prose and verse with equal facility. Prin. works: *Alcools* (poems), 1913; *Les Peintres cubistes* (essays), 1913; *Calligrammes* (poems), 1918; *Contes choisis*, 1923. A. had great influence on European art and literature. See A. Billy, *Apollinaire*, 1947.

Apollinaris, Sidonius (c. 434-88), b. Lyons of noble family, connected by marriage with the Emperor Avitus. His learning saved him when Lyons was captured by Majorian, and also when Rome was taken by the Goths. He became Bishop of Clermont. Some of his writings survive.

Apollinaris the Younger (d. c. 390), Bishop of Laodicea in Syria, was so bitter an opponent of Arianism that he even denied the existence of the human mind in Christ's human nature. His views were finally condemned at the Occumenical Council of Constantinople (381).

Apollinaris Water, alkaline mineral water from the Apollinaris spring in the valley of the Ahr, near Bad Neuenahr, in Rhineland-Palatinate (q.v.), Germany, 60 m. NW. of Mainz (q.v.).

Apollo, in classical mythology the son of Zeus and Leda; b., with his twin sister Artemis (q.v.) in the is. of Delos, where Leda had taken refuge from the jealousy of Hera. A. stands in Gk character and life for all we think of as civilisation. Yet all scholars are agreed that he is of non-Hellenic origin. Whence he is derived is uncertain: two main groups of scholars hold widely differing views. One, supported by Wilamowitz and Nilsson, assert that he came from the interior of Asia Minor; they believe it probable that he may have derived from Apulunas, the Hittite gate-god identified by Hrozy in 1936. Others, led by H. B. Cook and Prof. H. J. Rose, affirm that A. was originally a god of shepherds in the wild regions of the N. Whatever view is adopted, it must be remembered that the manifold characteristics of the classical A. are derived from numerous sources. The most important aspect of A. is his interest in all matters affecting law and order, as well in the physical and social as in the intellectual and moral spheres. It is certain that in his twofold character of judge (especially in cases of homicide, which involved pollution) and ritual purifier he forms a link between the Hellenic religion and the more ant. cult of chthonian gods. The Romans made their first contact with A. partly through the Etruscans and partly through the Gk states of S. Italy. There was a temple to him at Rome as early as 432

bc. In republican times he was venerated chiefly as a god of healing and prophecy; but his status was greatly enhanced by the devotion of Augustus who erected magnificent temples of A. at Actium and on the Palatine. The famous statue known as the A. Belvedere, in the Vatican, does not represent the Gk conception in the strictly classical age. This is better seen in more ant. figures, e.g. the 'Strangford A.' in the Brit. Museum, and in a splendid terra-cotta figure from Veii now in the Museo di Villa Giulia at Rome. From the 5th cent. bc A. was identified with the sun god. See also DELPHI and ORACLE.

Apollo of Rhodes, colossal bronze figure of the sun god, reckoned among the 7 wonders of the ant. world. It is said to have been the work of Chares of Lindus (q.v.) and to have been set up by the Rhodians about 280 bc in gratitude for the successful defence of the city against Demetrius. The height was probably about 90 ft., and the work is stated to have occupied the sculptor 12 years. It stood near the harbour, though a legend that it bostrade the entrance and ships passed between its legs is unfounded. In 224 bc it was overthrown by an earthquake. The metal was sold by Arabs after they captured Rhodes in ad 653. See also COLOSSUS.

Apollodorus, Athenian painter of the end of the 5th cent. bc and master of Zeuxis. He introduced some innovations in perspective and seems to have been the first to study light and shade. His works include an *Odysseus*, and an *Ajax* struck by lightning, admired by Pliny.

Apollodorus (2nd cent. bc), Athenian scholar to whom earlier critics falsely ascribed a celebrated work on Gk mythology entitled *Bibliotheca* (i.e. *The Library*) which was probably written during the early Christian period. See J. G. Frazer, *Apollodorus: The Library* (with trans.), 1921.

Apollodorus, famous architect of the 2nd cent. ad, was b. Damascus. He became a favourite of the Emperor Trajan, for whom he constructed a bridge over the Danube. He also designed a number of buildings and triumphal arches. He offended the future emperor Hadrian by his outspoken denunciations, and on Hadrian's accession he was put to death on trivial charges.

Apollonia: 1. Ant. city of Illyria, near mouth of It. Aous. Colonised by Corinthians and Corcyraeans, and famous as a place of learning in Rom. times.

2. Ant. city of Thrace, on the Euxine. Colonised by emigrants from Miletus. The colossal statue of Apollo by Calamis (5th cent. bc) was removed from here to Rome by Lucullus, 72 bc. The site is now occupied by Sisboli.

3. Ant. tn in Cyrenaica, bp. of Eratosthenes; now Marsa Suza.

Apollonius Dyscolus, or the Surly (fl. c. ad 150), Gk grammarian, whose *Syntax* was the leading work on that subject until the 19th cent. Priscian (q.v.) calls him *grammaticorum princeps*. There is an ed. of his surviving works by

R. Schneider and G. Uhlig in *Grammatici Graeci II*, 1-2, 1878-1910. See J. E. Sandys, *History of Classical Scholarship*, I (3rd ed.), 1921.

Apollonius of Perga (c. 262-c. 200 BC), Gk geometer of the Alexandrian school. He is classed with Euclid and Archimedes (q.v.) as one of the founders of mathematical science. His treatise on *Conics* was pub. in 1710 by Edmund Halley who in 1706 had pub. a trans. (from an Arabic version) of A.'s *Cutting off a Ratio* together with a restoration of the *Cutting off an Arca*. A restoration of the *Determinate Section* was pub. by R. Simson in *Opera quaedam reliqua*, 1776. See also T. L. Heath's ed. of the *Conics* with modern notation, 1896.

Apollonius of Tyana (c. 295-c. 230 BC), Gk poet and grammarian, b. at Alexandria. His most famous work is the *Argonautica*, a poem in 4 books on the legend of the Argonauts. After some time spent in Rhodes, he was recalled to Alexandria and appointed librarian at the Museum by Ptolemy Epiphanes (196 BC). There is an ed. of the *Argonautica* (with trans.) by R. C. Seaton, 1900, and a trans. by A. S. Way in the *Temple Classics*, 1901. See E. Delage, *Biographie d'Apollonius Rhodius*, 1930.

Apollonius of Tyana, Gk philosopher and mystic of the Neo-Pythagorean school; b. a few years before the Christian era. He studied at Tarsus, and became a follower of the doctrines of Pythagoras. He claimed for himself a divine mission, and gathering around him a number of disciples, he travelled widely in the east, visiting Nineveh, Babylon, and India, where he came under the influence of oriental mysticism. When he returned he was received with great honour, and many miracles were ascribed to him, though he himself claimed only prophetic vision. He was patronised by Rom. society, and during the height of his fame wandered through W. Europe. Later, after being accused of conspiring against Nero, he retired to Ephesus, where he opened a school, and d. there at the age of nearly 100 years. His biographer Philostratus gives an account of his life, which must, however, be stripped of its exaggeration and fiction before we can see a glimpse of the earnest striver after a higher life. There is an ed. with trans. of Philostratus's life by F. C. Conybeare, 2 vols. (Loeb Library), 1912. See also H. C. Schnur, *Mystic Rebels*, 1949.

Apollonius of Tyre, name of a medieval tale which is supposed to have a Gk origin. The first mention of the tale seems to be about the latter end of the 6th cent. The story relates how A. of T., having solved a riddle which revealed a guilty secret of King Antiochus, has to flee in order to escape the wrath of the king. In Cyrene he marries, and on the death of King Antiochus, he goes to claim Antioch, to which kingdom he is heir. On the voyage his wife apparently dies in giving birth to his daughter. The corpse is thrown overboard and the daughter left at Tyre. After 14 years of vicissitudes the three, husband, wife, and

daughter, are miraculously restored to each other. The story had great popularity during the Middle Ages in almost every country. Shakespeare used it in his drama called *Pericles*.

Apollon, Alexandrian Jew described in the Acts of the Apostles (xviii. 24-8), an eloquent speaker and a man mighty in the Scriptures. Until his 'conversion' by Priscilla and Aquila he appears to have preached only the baptism of John. There remains still some doubt as to exactly what form this 'conversion' took, since he appears always to have been in some sense a Christian. John the Baptist had pointed out Jesus as the Messiah, and there must have been many, besides his disciples, who had picked up some knowledge of Christianity and become serious Christians, only awaiting fuller instructions. A. became a follower and fellow teacher with Paul, and much of his work was done in Corinth, where he gained great influence (1 Cor. iii. 4). Martin Luther believed him to be the author of the Epistle to the Hebrews.

Apollyon (Gk meaning 'destroyer'), given in Rev. ix. 11 a sa. trans. of the Heb. 'Abaddon,' 'the angel of the bottomless pit.' A. forms a striking figure in Bunyan's *Pilgrim's Progress*. His identification with the Asmodeus of Tobit seems doubtful.

Apologetics and **Apologetics** (from the Gk *apologia*, a defendant's personal reply to his accuser, e.g. Plato's *Apology of Socrates*), explanation and defence of religious belief in general, and of the Christian faith in particular, covering much of the same ground as Fundamental Theology (q.v.). The need of A. has been apparent from the beginning, since from the start Christianity was the subject of misrepresentation, abuse, and persecution. It was also faced by a developed culture and philosophy to which its beliefs had to be commended and made intelligible. A. has passed roughly through three main stages or eras. (1) From AD 30 to the fall of the Rom. Empire A. were addressed to the Jewish and Pagan worlds. Some of the N.T. writings have an apologetic (i.e. defensive, and commendatory) character—e.g. St Luke's Gospel, and Romans xiii. But the *Apologetics of the Fathers* were the first systematic works of the kind. They had as their objects to uphold Christianity against heathenism, to refute the false accusations made against Christians, and to show emperors the injustice of persecution. Among the Gk apologetics of the 2nd cent. were Justin Martyr, who wrote *Apologia Prima pro Christianis* and *Apologia Secunda*, usually referred to as one *Apologia*, c. 150; Athenagoras, who defended the Christians against the charges of atheism, incest, and infanticide; Tatianus; Theophilus of Antioch; and Hermas. Among the Lat. apologetics of the 2nd cent. were Tertullian, with his *Apologeticus*; Minucius Felix, who wrote the dialogue *Octavius*; and Cyprian. *On the Absurdity of Idolatry*. In the 2nd and 3rd cents. Origen, a Greek, and Arnobius, a Latin, wrote against the

attacks of Celsus, Porphyrius, Hierocles, and Julian, who attacked the hist. and doctrines as well as the morals of the Christians. The greatest of these Apologists was Eusebius, whose *Evangelical Preparation* (15 vols.) and *Evangelical Demonstration* (20 vols.) explain the harmony between the O.T. and N.T., uphold the teachings of Christ and of His disciples, and examine the *Life of Apollonius of Tyana* by Philostratus. Other apologists were Athanasius, Chrysostom, Cyril of Alexandria, and Theodoret, who proves Christianity from the writings of the heathens; Lactantius (*Divinae Institutiones*); St Augustine (*On the City of God*); and St Jerome. (2) From c. 652 (the death of Mohammed) to c. 1500 (the Reformation) A. were chiefly concerned with the defence of Christianity against the Muslim religion and philosophy. The first great apology of this kind was that of St John of Damascus (c. 750) in the form of a discussion between a Christian and a Saracen. During the Middle Ages Jewish and Moslem enemies took up new lines of attack. Among them were Avicenna, Averroes, Maimonides, and Jehuda Halevi, who were opposed by St Anselm, Abelard, St Albert the Great, and St Thomas Aquinas. The Christian fruit of these controversies was the 'Thomist compromise,' which declares that certain doctrines are beyond the sphere of reason. The 'nominalists,' Wm of Occam, Buridan, and others, going further, declared all matters of faith to be above reason. (3) From 1500 to the present, A. fall into two compartments: (a) the Catholic and Protestant controversy, producing its apologists on both sides; (b) the defence of Christianity by Catholic and Protestant alike against Deism, Pantheism, Materialism, Agnosticism, and Rationalism (q.v.) of all kinds. A. have also had to deal with the alleged conflict between Science and Religion. Searching Biblical criticism produced scepticism in some of its early and tentative stages, but has tended more and more strikingly to confirm Christian belief, so that it may be regarded now as a valuable branch of Christian A. As for the chief apologies of this period, that of the Huguenot P. de Mornay (1574) was the first in a modern language. Butler's *Analogy of Religion*, 1726, is outstanding, and so is Paley's *Evidences of Christianity*, 1794. Charles Gore's *Reconstruction of Belief*, 1926, is a notable work of this cent. The work of the Society for the Promotion of Christian Knowledge (q.v.) and of the Catholic Truth Society, is chiefly Apologetic. See also R. Mackintosh, *Primer of Apologetics*. **Apologia pro Vita sua** (defence of his career), autobiographical sketch of his position in the Oxford Movement, issued by Cardinal Newman in 1864. It contains his reasons for joining the Rom. Catholic Church, and refutes Charles Kingsley's accusations, which were the immediate cause of the *Apologia*. See *Everyman's Library* ed. and recent biographies by Robert Sencourt and Maisie Ward, 1948.

Apologue, fabulous story, in which a worldly-wise or moral lesson is conveyed in a lively, dramatic, and often satiric manner, the characters employed being generally of a lower order than man. See Jotham's so-called parable (Judges ix), also the fables of Aesop and others, and the Ger. *Reineke Fuchs*. A true 'parable' is more spiritual in its teaching than an A.

Apology (Gk *apologia*), originally signified a defence made in a court of justice by or for a person accused, e.g. Plato's *Apology of Socrates*. The word was also used for a work in defence or justification of what might be considered wrong, or be opposed, e.g. Tertullian's *Apology for Christianity*, Bishop Watson's *Apology for the Bible*, and Barclay's *Apology for the Quakers*. In ordinary language it is used in the sense of asking pardon for an offence.

Apomorphine (C₁₇H₁₇O₂N), artificial alkaloid, derived from morphine by the abstraction of a molecule of water. It is administered hypodermically or by the mouth to produce vomiting, and is therefore an emetic. It is also used in small doses as an expectorant. In small, non-emetic doses it has a sedative and hypnotic action and is sometimes used in cases of hysteria and delirium.

Aponi Fons, see ABANO TERME.

Aponogeton, only genus of family Aponogetonaceae, of which *A. distachyos*, Cape pondweed, or Water Hawthorn, and its varieties, are favourite water plants from S. Africa; and *A.* (synonym *Ouvirandra*) *fenestralis* is the Lace-leaf, or Lattice-leaf of Madagascar, and sometimes grown in indoor aquariums. *A. krauseanus* is hardy.

Apophthegm, or **Apophthegm** (Gk *apophthegma*, a thing spoken out), short, pithy, and instructive saying, intended to convey an important truth to the hearers. Plutarch made a collection entitled *The Apophthegms of Kings and Generals*, and also of the A.s of the Lacedaemonians entitled *Laconica*. Cicero called them *salinae*, salt pits. An example is: 'We ask advice, but we mean approbation.' Bacon made a collection entitled *Apophthegms New and Old*.

Apophyllite, mineral consisting chiefly of calcium silicates, and corresponding to the formula 4H₂CaSi₂O₆ + KF + 4H₂O. It occurs in association with the zeolites (q.v.), and large crystals have been found in India, Mexico, and the Harz Mts.

Apophysis, in physiology, protuberance or process on a bone, having no independent centre of ossification, and so forming a continuous part of the bone. Especially applied to the spinal vertebrae. In botany, a swelling of the seta below the theca or spore case in certain mosses, or on the scales on the cones of certain pines.

Apoplexy, medical term meaning a sudden loss of brain function due to a vascular catastrophe. The usual causes of A. are (1) bursting of a cerebral blood vessel and haemorrhage from it; (2) blockage of a cerebral blood vessel either from thrombosis, i.e. clotting of the blood within the vessel, or from embolus

(q.v.). The signs of A. vary, from the slight and transient to the severe, according to the extent and position of the vascular accident. The effect of A. is to cut off the circulation to that part of the brain supplied by the affected vessel, with consequent death of brain tissue unless the circulation is speedily restored. In cases of persisting haemorrhage or spreading thrombosis the area of brain damage is extended, and in haemorrhage parts of the brain distant from the haemorrhage itself also become affected as a result of increasing intracranial pressure. The skull is a rigid box and the volume of its contents cannot increase beyond a certain amount without exerting constrictive pressure on the compressible tissues of the brain. Predisposing causes of A. are arteriosclerosis (q.v.), hypertension (see BLOOD PRESSURE), aneurysms (q.v.) of the cerebral arteries, cerebral tumours, diseases of the heart valves giving rise to emboli and any condition in which the circulation is enfeebled, as in old age. The precipitating cause may be anything which increases the intracranial pressure such as straining, spasms of coughing, sudden exertion, etc. The usual immediate signs of A. are unconsciousness, stertorous breathing and paralysis of one or both sides of the body depending upon the extent of the cerebral damage. In very mild cases the paralysis may be limited and transient and without loss of consciousness. It is probable that these mild cases are due to a passing vascular spasm and not to true A. Nevertheless the predisposing cause is similar and cases of vascular spasm may be regarded as warnings of a possible future A. In cases of extensive haemorrhage or thrombosis the patient does not recover consciousness, coma deepens and death ensues. The after effects of A. in those who survive the immediate crisis depend on the amount of cerebral damage. In some the paralysis remains permanent, in others it recovers partly or wholly. Mental confusion may persist due to destruction of cortical brain cells. Treatment consists in trying to lessen the extent of the immediate catastrophe. The patient should be laid flat and turned to one side to prevent swallowing of the tongue and the inhalation of vomit and other secretions. False teeth should be removed. The clothing should be loosened and cold applications placed on the head. As soon as recovery from the immediate effects of A. has occurred, treatment consists in the rehabilitation of the patient to as near normal life as possible, re-educating him to use paralysed muscles, preventing chronic contractures in those irreversibly paralysed, and encouraging the use of the mental faculties.

Aposiopsis (Gk *apo*, from; *σιόπειν*, to be silent), sudden breaking off of a sentence before its conclusion, for rhetorical effect, as in the quotation from Scott, 'Bertrand is—what I dare not name.' See also FIGURE OF SPEECH.

Apostasia, herbaceous plants belonging

to the family of the *Apostasiaceae*; they originally came from the mountainous forests of Java and the Penang Is.

Apostasy, Gk word which originally meant defection from the military standard, but later more generally a lapse from Christianity, especially if from unworthy motives. In the Rom. Church it was also used for the renouncing of monastic or clerical vows. Julian the Apostate, Rom. Emperor 331–63, attempted to restore paganism for Christianity as the Rom. religion.

Apostle (Gk *apostolos*, messenger or envoy. A title now specially applied to representatives sent out by Jesus Christ (Luke vi. 13). The name was not at first confined to the twelve, for in 1 Cor. xv Paul says of our Lord, 'He was seen of Cephas, then of the twelve, after that he was seen of James, then of all the apostles.' Evidently while the twelve were pre-eminent, others also were recognised as A.s, and even among the twelve there was a differentiation. 'The Pillars' stood out above the rest, and 'the Lord's brethren' were specially honoured. In Acts xiv Paul and Barnabas are both spoken of as A.s, though neither of them belonged to the twelve. The title thus bestowed on many leading ambas. of Christ was claimed by some who were not entitled to it (Rev. ii. 2). The qualifications for an A., at any rate in the full sense, are indicated in Acts i. 21f.: personal eye-witness to the truth of the Resurrection of Christ, they must have seen the Risen Lord (cf. 1 Cor. ix. 1). They had also to have received a commission either direct from Christ or mediately through the others. During the 2nd cent. a traditional restriction grew up; after this we seldom find any but the original twelve, Matthias, and Paul entitled A.s, their chief followers being spoken of as 'evangelists' and 'apostolic missionaries.'

Apostle Islands, U.S.A., group of 27 is. in SW. part of Lake Superior, 10 m. off the Wisconsin shore. The largest is Madeline Is., 13 m. long, 3 m. wide. They are scenic, with abundant game.

Apostle Jug, form of stoneware vessel much used in the 16th and 17th cents. It was made both with and without a lid, and was so called on account of its ornamentation with the figures of the 12 apostles in relief.

Apostle Spoons, common as christening presents during the 15th and 16th cents. Each handle bears the figure of an apostle. A complete set of 12 spoons is now rare and commands a high price.

Apostles, Acts of the, see ACTS.

Apostles, Teaching of the, or the *Didaché* (Gk for teaching), early Christian work discovered at Constantinople and pub. in 1883. It contains 16 chapters, and is divided into 2 parts, the first of which gives an account of the 2 ways of life and death. Harnack, Taylor, and others believed that the first part of the *Didaché* (Chs. i–vi) was originally a Jewish work entitled *The Two Ways*. These chapters substantially appear also in the *Epistle of Barnabas*, and (c. 3rd or

4th cent.) in the *Apostolic Constitutions*. The second gives the rules governing the service, the sacraments, and the ministry in the church; it is a document of great importance for the study of liturgical development. The exact date of the work is not known; the dates assigned to it vary from the latter part of the 1st cent. to the second half of the 2nd cent. It is of E. origin. See H. Bettenson, *Documents of the Christian Church*, 1943, and G. Dix, *The Shape of the Liturgy*, 1945.

Apostles' Creed, see CREED.

Apostles' Days, feasts of commemoration of the apostles. In the Roman and Anglican churches these are: Matthew, 21 Sept.; John, 27 Dec.; Peter, 29 June (and in the Rom. Catholic Church, Paul, who is commemorated in the Church of England only on the feast of his conversion, 25 Jan.); Thomas, 21 Dec.; Philip and James, 1 May; Simon the Canaanite and Jude, 28 Oct.; Bartholomew, 24 Aug.; Andrew, 30 Nov.; Matthias, 24 Feb.; James the son of Zebedee, 25 July. In the Gk Church the following dates are different: Matthew, 16 Nov.; John, 26 Sept.; Thomas, 6 Oct.; Philip and James, 9 Oct.; Bartholomew, 25 Aug.; Matthias, 9 Aug.; James the son of Zebedee, 30 April.

Apostolic Constitutions, 8 books of what claim to be Church customs and rules laid down by the Apostles and recorded by St Clement of Rome. Actually this longest and best known of the Church Orders is a compilation from earlier works of the kind, freely adapted and enlarged, namely *The Didascalia* (Bks 1-6), *The Didache* (Bk 7), and the *Apostolic Tradition* of Hippolytus (Bk 8). The writer was a pious Arian of Antioch in the 4th cent., probably the interpolator of the epistles of St Ignatius the martyr (q.v.). The liturgy of the eighth book, and indeed the whole work, throws light on Antiochene practice in his time. See F. X. Funk, *Didascaliae et Constitutiones Apostolorum* (2 vols.), 1905; C. H. Turner, article in *Journal of Theological Studies*, xv. 53; G. Dix, *The Apostolic Tradition*, 1936.

Apostolic Fathers, Christian writers intermediate between the Apostles and the later apologists. The name belongs strictly only to those believed to have had actual contact with the Apostles, as Sts Clement, Ignatius, and Polycarp; but in common usage it includes others who, in the 2nd cent., carried on the traditional teaching of the primitive church, e.g. Hermas, Papias, and the writer to Diognetus.

Apostolic Majesty, title of the kings of Hungary conferred by Pope Sylvester II upon St Stephen, King of Hungary, in 1001. It was renewed by Pope Clement XIII in 1758 in favour of Maria Theresa, and subsequently was used by all the Hapsburg rulers of Hungary until the monarchy ended in 1918.

Apostolic Succession, doctrine that the power of ministering in the Christian and Catholic Church can be derived only from a validly consecrated bishop, i.e.

one who had himself been validly consecrated, and so on back to the time of the apostles. As first appealed to, against heretics like the Gnostics, who claimed their own secret apostolic tradition and teaching, the A. S. denoted the fact that every diocese of the true Church of Christ was ruled by a bishop who had received his office from his predecessors in an unbroken line of succession from the apostles, and so was the authentic possessor of the apostolic tradition in all its completeness. (Cf. Irenaeus, *Contra haereses*, III, iii. 1; Tertullian, *De praescript.*, 20, 21; Hippolytus, *Philosophumena*, I proem.) The natural extension of the term to describe the parallel fact of a continuous chain of consecrators and ordainers, passing on the ministerial commission and its powers from the apostles to the present day, and of the fact that this was a vital fact for the validity of the ministry and sacraments in any age, was first made by St Augustine in his great controversy with the Donatists. This doctrine has been explicitly maintained in the Catholic Church and the Orthodox Church of the E. ever since. The Protestant Churches, however, rejected the doctrine at the Reformation, and formed new ministries of their own, on what appeared to be N.T. lines which had no claim to an A. S. The Church of England continued the ancient threefold form of ministry, and claims to possess the A. S., but leaves it an open question whether the ancient Catholic teaching on the A. S. is true or not, whether a ministry in the A. S. is of the *esse* of the Church, or only of its *bene esse*. See H. B. Swete, *Early History of the Church and Ministry*, 1918.

Apostolici, imitators of the apostolic life mentioned by Epiphanius (*Haeres.*, 67). In the middle of the 12th cent. there existed a sect called Apostolic Brothers on the banks of the Lower Rhine; they rejected oaths, infant baptism, fasts, ceremonies, worship of saints, purgatory, masses, second marriages, and the authority of the Pope. Some of them were brought before the eccles. court of the Archbishop of Cologne, and were afterwards burned to death. About 1260 Gerhard Segarelli of Parma founded another apostolic brotherhood which rejected the authority of the Pope, oaths, and capital punishments.

Apostolius, Michael (d. c. 1480), Gk theologian and native of Constantinople. When the Turks conquered the city he fled to Italy, and so zealously upheld Plato against Aristotle that he lost the protection of his patron Cardinal Bessarion, and retired to Crete. His *Paroemiae*, a collection of Gk proverbs, was pub. in 1619, ed. by Heinsius. See also *Oratio panegyrica ad Fredericum IV.*

Apostrophe (Gk *apo*, from: *strephein*, to turn): 1. A figure of speech in which the speaker turns from his main subject to address some absent person or quality, as in 'O Death, where is thy sting?' or, in one of Hamlet's speeches, 'Frailty, thy name is woman.' See also FIGURE OF SPEECH.

2. A comma (') denoting elision, as in e'er. In the genitive singular it represents the *e* of the A.-S. ending *es*, as man's for *mannes*. The incorrect use of the (') is a very common error.

Apothecaries, Society of, see APOTHECARY.

Apothecaries' Measure, see METROLOGY.

Apothecary, originally one who prepared and traded in drugs. In medieval England the A.s engaged in a flourishing trade in drugs and spices from the E. In the 14th cent. they became merged in the Grocers' Co., but, under a charter from James I early in the 17th cent., they separated again to form their own company: they then had the monopoly of buying and selling drugs within the city of London. In this way the A.s were the pharmacists of the time, and one of their functions was to dispense the prescriptions of the physicians. Not long remaining content with compounding drugs to the physicians' orders, and no doubt urged on by public demand, the A.s started invading the prov. of the physicians by treating the sick—much to the annoyance of the Royal College of Physicians (q.v.), which had failed in its attempt to have a clause inserted in the A.s' charter forbidding them to practise medicine. In the great plague of London in 1665 most of the physicians left the city but the A.s stayed and attended the sick. In 1704 the House of Lords pronounced judgment in favour of the Society of A.s and against the Royal College of Physicians to the effect that an A. could without the advice of a physician prescribe for a sick patient. Although this judgment estab. the legal right of A.s to treat patients in addition to making up and selling drugs, they were not allowed to charge a fee for the advice they gave but only for the medicines they made up. This limitation, which persisted for a long time, was undoubtedly the foundation of the 'bottle of medicine' habit so deeply ingrained in the mind of the Brit. people. The origin of the general practitioner or family doctor as he is known to-day may be said to have sprung from the time when the A. was permitted to give advice and medicine to patients. A further step in this direction was taken in 1774 when the Society of A.s passed a resolution limiting its membership to those who were practising A.s—i.e. medical practitioners. Apprenticeship, as before, remained the mode of entry to the livery of the society. An Act of Parliament of 1815 gave the Society of Apothecaries of London the power to examine all A.s in England and Wales and grant them licences to practise. This gave a great stimulus to medical education, which before that time had followed no prescribed course. The regular teaching of students was started at many of the prin. hospitals. To this day the medical student may qualify to practise medicine by passing the society's licensing examination, which is recognised by the General Medical Council (q.v.) for purposes of registration. To the Society of Apothecaries must go

much of the credit for raising the standard of medical practice and the status of medical practitioners during the 18th cent. and for paving the way for the modern general practitioner, in favour of whose title that of A. has now given way in common usage. The address of the Apothecaries' Hall is Blackfriars Lane, Queen Victoria St, London, E.C.4.

See Sir Zachary Cope, 'Influence of the Society of Apothecaries upon Medical Education in *British Medical Journal*, 1. 1956.

Apothecia (Gk *apothēkē*, storehouse) are open, shield-like fruits or ascocarps of certain fungi of the class Discomycetes, e.g. *Phydia parietina*. Here they may be seen attached to the surface of the leaf-shaped thallus, of a darker orange colour than the rest of the plant.

Apotheosis, deification, the recognising of a mortal as a god—not uncommon in polytheistic religions. (See Froude's *Short Studies*, vol. III.) Alexander the Great accepted divine honours, as did the Seleucid Antiochus Epiphanes. Julius Caesar was deified by Augustus, and this precedent was followed by other Caesars who were worshipped in their lifetimes. Even their relatives and favourites were often thus honoured, e.g. Antinous by Hadrian. See also GENIUS.

Apotome: 1. In anc. Gk music, the remainder of a whole tone when diminished by a limma or smaller semitone, the ratios being 2187 and 2048.

2. The difference in quantities which are commensurable (q.v.) only in power, i.e. in square, cube, etc., as between $\sqrt{2}$ and 1, which is the difference between the diagonal and side of a square.

Appalachian Mountains. These mts form an important feature in the physical geography of the U.S.A., separating the plain of the Mississippi-Missouri from the Atlantic slope. Their total length, about 1500 m., extends from the St Lawrence to Alabama, and their width in some parts reaches 300 m. They are longitudinally divided into a number of ranges and valleys, the latter forming a chain known as the Great Appalachian Valley. The chief ranges in the N. are the White Mts and the Green Mts (Vermont), the Catskill Mts, New York, and some smaller hills N. of the St Lawrence; in the centre, the Blue Ridges of Pennsylvania and Virginia; in the S., the Black and the Great Smoky Mts. The highest of the N. peaks rise to 5000 or 6000 ft., many in the S. reach nearly 7000 ft. On the W. the Allegheny plateau slopes to the Central Plain. The E. ranges are pierced laterally by the Hudson, Delaware, and other valleys, but the W. plateau is almost unbroken. This had a notable effect on early colonisation; Eng. settlers, with great labour and hardship, worked their way along the rvs. to the Appalachian Valley, but there they were stopped for many years by the difficult country, and also by the enmity of the red men, encouraged by the French from Canada and the Spaniards from Louisiana. This check helped to fill up and solidify the Atlantic states, and hardened them

for their later contests with France and England.

The chief rivs. of the Appalachian system are the St John (N. Brunswick), Hudson, Delaware, Susquehanna, Potomac, and James on the E.; the Alabama flowing S., and the Tennessee, Cumberland, and Kanawha into the Ohio. The ranges are largely covered with forests, and wild animals are numerous, including the bear, lynx, and deer.

Appalachicola, see APALACHICOLA.

Appanage, or **Apanage**, in Fr. law, was the provision of lands or feudal superiorities assigned by the kings of France for the maintenance of their younger sons, and was in practice from the time of the Capets until 1832. Towards the close of the 13th cent. the rights of the *apanagiste* were further circumscribed, and in 1790 it was enacted that the younger branches of the royal family of France should be provided for out of the civil list until they married or attained the age of 25, and that then a certain income called *rentes apanagères* was to be granted them. In 1832 the word A. was substituted for that of *dotation*. The term A. is now given to the allowance made to the princes of a reigning house out of the public funds. In Scotland A. is the patrimony of the prince and steward, and in England the Duchy of Cornwall is the A. of the sovereign's eldest son.

Apparatus Sculptoris, or the **Sculptor's Workshop**, constellation distinguished by Lacaille. It is situated in the region of the heavens immediately to the E. of the large star Fomalhaut or a Piscis Australis, and hardly rises above the horizon in the lat. of the Brit. Isles. It is bounded by Cetus, Aquarius, Fornax, Piscis Australis, and Phoenix.

Apparent. In astronomy corrections have to be made for vitiating factors, i.e. the effects of atmospheric refraction, aberration, precession, etc. The positions of heavenly bodies before such corrections are applied are the *apparent positions*.

Apparent Magnitude, in optics, the angle formed by two visual rays drawn from the centre of the pupil to the extremities of the object. Also used in astronomy to denote the brightness of celestial objects. See MAGNITUDE.

Apparent Motion, speed and direction in which a body appears to move, relative to a moving observer.

Apparition, immaterial appearance as of a real being; a spectre or ghost. From the earliest ages amongst all peoples a belief in A.s was prevalent, and it only ceases to exist with a more enlightened knowledge of the circumstances which affect the minds of men. Amongst savages there is often a belief that when a man is asleep his soul leaves his body and wanders in the night, and that the adventures which happen to the soul in its wanderings are real circumstances. The soul is supposed to visit friends, relations, or enemies, and these visitations are called dreams by the person visited. There is another belief among many people that when a man dies his spirit still lives and is seen by other people as a dream or a

phantasm. In the early religions the worship of the dead played a great part, for sacrifices were made to members of the family who had died, who although dead were still aware of the actions of the living and could affect them with sickness as a punishment for offences and impiety. Closely allied to this belief in A.s is the belief in ghosts, who were supposed to be the souls of deceased persons, appearing in a visible form, or otherwise manifesting their presence, to the living. The spirit of a murdered man is said to visit the murderer in the night. Ghosts have been alleged to appear in the same dress they wore when living; they are often pale and cloudy in appearance, and the ghosts seen in churchyards are often clothed in white. A mind which is deranged by fear, by disease, or even by excitement, has a tendency to form images of those objects which have caused the derangement. Fear of a certain object has often caused that object to appear to the mind. A.s have in all ages formed the subjects of pictures and of writings. The Society for Psychical Research conducts investigations in this field. Amongst the works written on A.s and kindred phenomena may be mentioned: R. Baxter, *Certainty of the World of Spirits*, 1691; S. Hibbert, *Sketches of the Philosophy of Apparitions*, 1824; C. Crowe, *Night Side of Nature*, 1852; Andrew Lang, *The Book of Dreams and Ghosts*, 1897; C. Richet, *Thirty Years of Psychical Research*, 1923; E. Bennett, *Apparitions and Haunted Houses: A Survey of Evidence*, 1939; H. Price, *The Most Haunted House in England*, 1940, and *The End of Borley Rectory*, 1946; and the pubs. of the Society for Psychical Research. See also ANCESTOR WORSHIP; ANIMISM; HALLUCINATION; PSYCHICS.

Apparitor, in Rom. times, an attendant on magistrates who saw to the execution of their orders. The term extended to a great variety of officers (see Justinian's Code, 12, tit. 52, etc.). In the Eng. eccles. courts the A. served processes of the court and causes defendants to appear by summons.

Appeal. In law, to remove a cause from an inferior to a superior court for the purpose of re-examination or for decision. In it the party appealing, called the appellant, tries to show that the decision of the lower court on a matter of fact or of law was erroneous, that the verdict was against the weight of evidence, or the sentence excessive. By this means judicial abuses are reduced to a minimum and something approaching uniformity in judgment is secured by the fact that the judges or magistrates in the lower courts have the precedents and dicta of the higher courts to guide them. The party appealed against is called the respondent or appellee. The idea underlying the system of A. would appear to be that a prin. does not divest himself of responsibility when delegating his authority to an agent. Judges being but the agents of the king, and through the king of the community, the responsibility for their decisions should, in grave cases at any rate, be brought home to its source.

It is this idea which enabled St Paul, brought before Festus, to say, 'I appeal to Caesar' (Acts xxv), and to have his A. allowed, and it is this idea which gives to every Brit. citizen the right of appealing in the last resource to the 'King (or Queen) in Parliament,' in other words, to the House of Lords. At the present time A.s can be made from certain dominion and colonial courts to the 'King (or Queen) in Council,' i.e., the Privy Council functioning through its judicial committee. In theory the entire House of Lords, or entire Privy Council, hears the A. In practice the House of Lords in its legal capacity consists of certain Law Lords whose functions are regulated by the Appellate Jurisdiction Acts, 1876 and 1887. The law lords consist of the lord chancellor, 4 lords of appeal in ordinary, and other peers of Parliament who hold, or have held important judicial office, 3 forming a quorum. No peer is excluded, but by custom peers other than those mentioned neither attend nor vote. In the case of *Bradlaugh v. Clarke*, in 1882, an eccentric and non-legal peer successfully asserted his right to sit and did so, voting with the minority. A.s lie from the courts of A. in England, and from the court of session in Scotland, but there is no A. from the Scottish high court of justiciary. A.s from the Eng. courts must be brought within 12 months. A.s from the court of session must be brought within 2 years. Each of the lords may make a speech in the form of a judgment giving his views, and the decision is by majority. If their lordships should be equally divided in opinion the decision of the lower court stands and each side must pay its own costs. The law lords may sit independent of the fact that Parliament is prorogued or dissolved. The Privy Council's jurisdiction as an appellate court has been subjected to many modifying statutes, the Act which constituted its judicial committee being passed in 1833. This committee consists of the president of the council and the lord keeper and other councillors who hold or have held high judicial rank in the colonies or at home. Two other privy councillors may be added by the sovereign and assessors in the persons of colonial judges, and in eccles. cases, of which the Privy Council is the final arbiter, bishops are sometimes added. The court of A. in England as constituted by the Judicature Acts, 1873-5, consists of the lord chancellor, ex-lord chancellor, the lord chief justice, the master of the rolls, the president of the Probate Div., and 5 lord justices. The quorum is 3, unless both parties agree to have the case tried by 2, and no judge may hear in the A. court an A. against his decision in the lower court. The court of A. has 2 divs.: the master of the rolls presides in one, and a senior lord justice in the second. If possible, Queen's Bench cases are heard by 2 common law and 1 equity (Chancery) justice, and in Chancery cases the proportions are reversed. The court must hear motions for a new trial or to

set aside verdicts given by a jury. A.s are heard from both divs. of the high court, from the palatine courts of Lancaster and Durham, the Liverpool court of passage, bankruptcy, etc., and the question of registration and parl. election petitions under the Corrupt Practices Act. A.s from recorders' and magistrates' courts are heard in the first instance by the high court, and any further A. from that court would go to the court of A. and from there to the House of Lords. The A. court may, but in practice seldom does, hear fresh evidence on A., and it may reverse the findings of the lower court, but may content itself with ordering a new trial. In interlocutory matters appeal must be made within 14 days, in final cases within 6 weeks, of judgment. A.s in eccles. cases are heard by the Judicial Committee of the Privy Council. Until the Criminal Appeal Act, 1907, the practice of the criminal law in this country was almost unique in the fact that no A. was allowed from the assizes (other than on a question of law reserved by the trial judge for the opinion of the old court for crown cases reserved (q.v.)), though clemency might be exercised by the sovereign on the advice of the Home Secretary. While, of course, the royal prerogative of mercy remains, the court of criminal A. (England), with carefully defined and somewhat restricted jurisdiction, offers to the convicted criminal another chance. The court consists of the lord chief justice and 8 judges of the Queen's Bench Div. appointed by him in consultation with the lord chancellor. They do not, of course, all sit at the same time, but there must be not less than 3 and always an uneven number of judges. An A. lies to the court on any ground which involves a question of law alone, but it is only by leave of the court or upon the certificate of the trial judge that an A. lies on any ground involving a question of fact alone, or mixed law and fact. There is also a right of A., by leave of the court, against sentence. In a few specified cases there is a further A. to the House of Lords. What are known as divisional courts, that is, courts consisting of 2 high court judges, hear nearly all the A.s from quarter sessions and magistrates' courts, but the consent of the inferior court must in some cases first be obtained. Similarly, the consent of the divisional court is necessary before an A. from it to the A. court can be heard. The quarter sessions hear A.s from courts of summary jurisdiction (police courts) when sentences of imprisonment have been imposed 'without the option.' In the Scottish courts there is an A. from the outer to the inner house of the court of session: from the sheriff court to the court of session, when more than £50 is involved; from the sheriff-substitute to the sheriff-prin.; to the high court of justiciary, on points of law; from inferior courts in criminal cases; and to the quarter sessions from the petty sessions. For A. in the old criminal law of England involving trial by combat, see article under that head.

Appeals in U.S.A. Appellate jurisdiction in the U.S.A. may be considered under (1) A. from state courts to federal courts; (2) A. to the circuit courts of appeal; (3) A. to the Federal Supreme Court; and (4) A. in jury cases. (1) *A. from State to Federal Courts.* Such A. are authorised by statute where the interpretation of the Constitution, laws, or treaties of the U.S.A. is involved, or some right, privilege, or immunity is claimed thereunder. Such an appeal can only be taken after the unsuccessful party has carried the case through the state courts to the court of last resort and is still unsuccessful. (2) *A. to the Circuit Courts of Appeal.* The dist. courts and circuit courts exercise only original and not appellate jurisdiction. The courts of these 2 classes, together with the Supreme Court, formed the judicial dept of the Federal Gov. until the year 1891. In that year a new court was created, called the circuit court of appeal, to be held at one or more places in each circuit, presided over by the 3 judges authorised to hold the circuit courts throughout the circuit, or, in other words, the justice of the Supreme Court assigned to the circuit and the 2 circuit judges appointed for the circuit. By Acts in Congress the number of circuit judges of many cases has been increased to 3. In practice, however, the Justices of the Supreme Court only in rare instances serve in this capacity. When the circuit courts of appeal were estab., the appellate jurisdiction of the circuit courts was transferred to them, and they were given also a considerable part of the appellate jurisdiction previously exercised by the Supreme Court, the object of establishing the circuit courts of appeal being to relieve the Supreme Court of too great a burden. The circuit courts of appeal in the exercise of their general jurisdiction hear appeal cases from the dist. and circuit courts in suits between citizens of different states or between citizens of a state and aliens; also in Admiralty cases and cases under the patent, copyright, revenue, or postal laws, and in criminal cases unless the crime is capital or otherwise infamous, in which event the appeal is to the Supreme Court. With but few exceptions the decision of a circuit court of appeal is final and conclusive, and no further appeal to the Supreme Court is allowed. These courts do not hear A. from state courts. (3) *A. to the Federal Supreme Court.* The appellate jurisdiction of the Supreme Court embraces (i) A. from the dist. or circuit courts in convictions for a capital or otherwise infamous crime; in prize cases; in cases involving the interpretation or application of the Amer. Constitution and cases in which the constitutionality of any law of the U.S.A. or the validity or interpretation of a treaty made under its authority is in question; and in cases in which the constitution or a law of a state is claimed to be in contravention of the Amer. Constitution; (ii) A. from the circuit courts of appeal in any case certified by those courts to the Supreme Court or removed from them to the Supreme Court by direction of the

latter, and in some other cases in which A. to the circuit courts of appeal are not final; (iii) A. from state courts of last resort, but only in cases involving a Federal question. Such is the case when there is involved (a) the validity of a treaty or statute of the U.S.A., (b) the repugnancy of a state statute to the Federal Constitution, or (c) some decision made against any title right, privilege, or immunity claimed to be under the Constitution, statutes, treaties, or authority of the U.S.A.; (iv) A. from the Supreme Court of the Dist. of Columbia or the Supreme Courts of the states; (v) A. from the court of claims or from dist. or circuit courts in cases against the U.S.A. (4) *A. in Jury Cases.* The Constitution provides that 'no fact tried by jury be otherwise re-examined in any court of the U.S.A. than according to the rules of the common law.' But this article merely prohibits a review by a court sitting without a jury of the conclusions of fact reached by a jury, and there is an appellate jurisdiction in jury cases which allows the court to review the rulings of the trial judge and to reverse the decision of the judge entered on the verdict for errors of law.

Congress passed an Act in 1916 to give finality to the decisions of state courts and circuit courts of appeal in certain types of litigation, leaving to a discretionary review by the Supreme Court the question whether a national interest might be involved. This Act has diminished the number of cases of writs of error to state courts, but appears to have had very little effect on A. from the courts of error to the circuit courts of appeal. After the Act had begun to make itself felt in reducing the cases on error to the state courts, the most prolific source of the courts' business was the direct review of dist. court decisions. An Act was passed in 1925 by which it was hoped to assemble in a single statute the whole law defining the appeal power of the U.S. courts and to gather up the scattered provisions defining the jurisdiction of the circuit courts of appeal. The aim of the Supreme Court is to be allowed to confine its adjudications to issues of constitutionality and other matters of essentially national importance. It is open to doubt whether the Act has achieved this purpose to any appreciable extent, but in theory cases now come to Washington only from 3 sources: the dist. court, the circuit court of appeal, and the state court. A decision adverse to the constitutionality of Federal legislation cannot be taken from the circuit court of appeal except on *certiorari* (q.v.); but a declaration by the circuit court of appeal of the unconstitutionality of state legislation is subject to review as of right by the Supreme Court. See Felix Frankfurter and James M. Landis, *The Business of the Supreme Court: a Study in the Federal Judicial System*, 1928.

Appearance. In law, within 8 days from the service of a writ or summons, the defendant must 'enter an A.' by delivering to the proper officer of the court a memorandum stating his intention

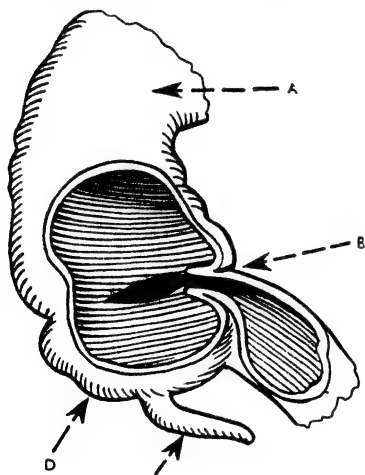
either to defend the case himself or to employ a solicitor on his behalf. Notice of this is given to the plaintiff. This procedure obviates the need of a personal A. In civil cases special provision is made for the representation of infants, lunatics, etc., by responsible persons.

Appellants, or Lords Appellant, title given to Thomas, Duke of Gloucester, and the earls of Derby, Arundel, Nottingham, and Warwick, who in 1387 'appealed,' i.e. accused of treason, De Vere and De la Pole, the advisers of Richard II during his minority. The Lords Appellant were responsible for the actions of the 'Merciless Parliament' of 1388. In 1397 Richard imprisoned Warwick and Gloucester, and had Arundel executed.

Appendant, legal term applied to incorporeal hereditaments. Thus advowsons may be A. to a manor; lands to an office; and various rights, as of fishing, to a freehold. A.S. as being originally annexed to the principal, are distinguished from appurtenances, which may be created by grant or prescription at any time.

Appendicitis, see APPENDIX and PERITONITIS.

Appendicularia, see LARVACEA.



APPENDIX

A, large intestine; B, entry of small intestine (showing valve) into D, caecum; C, appendix.

Appendix, in anatomy, an appendage; the term is applied particularly to the A. vermiformis, the small blind gut projecting from the caecum (see INTESTINE). The average length of the A. is $4\frac{1}{2}$ in. and the diameter about a quarter of an inch. The size, however, varies greatly, and

cases have been recorded of the congenital absence of the A. It has no known function in the human body, and probably represents an organ which is gradually being evolved out of existence. It is peculiarly susceptible to the inflammation known as appendicitis.

Appendicitis, or inflammation of the A. is favoured by any structural defects of the organ, such as unnatural length, location, and arrangement. The presence of faecal concretions and foreign bodies, such as seeds, gall-stones, bristles, worms, etc., may act as a predisposing cause, but the essential cause of appendicitis cannot be discovered in many cases. Females are less often attacked than men, because there is often a lymphatic connection between the A. and the right ovary, so that it is not so completely shut off. The onset may be gradual, but frequently is quite sudden. There are abdominal pains, fever, constipation, vomiting, and constant tenderness on pressure over a limited area midway in a line between the anterior superior iliac spine and the umbilicus. An attack of appendicitis may be slight and subside in a day or two with little disturbance to the patient. On the other hand suppuration of the organ may ensue leading to gangrene and rupture, and allowing the faecal contents of the bowel to escape into the peritoneal cavity. A general peritonitis (q.v.) results and the condition is serious. Sometimes the suppuration is so shut in by peritoneal adhesions that the abscess is localised and general peritonitis is prevented. The treatment of choice for appendicitis, when it is diagnosed within 48 hours, is surgical removal of the A. (appendicectomy). After 48 hours, provided that the peritonitis is not becoming generalised and abscess formation is remaining localised, the case is better kept under observation until the abscess has absorbed, when appendicectomy is performed. Done early in the disease appendicectomy is a safe and quick operation. On no account should any purgative be given to a patient suspected of having appendicitis.

Appenzell: 1. Canton of NE. Switzerland, enclosed within the canton of St. Gallen. It is divided, as a result of the religious differences during the Reformation, into Ausser-Rhoden, mainly Protestant and industrial, and Inner-Rhoden, Rom. Catholic and pastoral. The latter area, in the S. of the canton, is more mountainous, the culminating point being Säntis (8215 ft), famous for an extensive view over NE. Switzerland. A remarkable feature of A. is the yearly *Lands-gemeinde*, or general assembly, held in the open air in each Rhoden, at which every adult male citizen *must* appear, girt with a sword. Here the local gov. and the representatives to the Swiss Federal Assembly are elected. From the 11th to the 14th cent. A. was under the abbots of St. Gallen but after a hard struggle for independence it became a member of the Swiss Confederation in 1513. Its old code of laws (the Silver Book) is still used in swearing in the executive at the

Landsgemeinde in Inner-Rhoden. Ausser-Rhoden (pop. (1955) 48,500), cap. Herisau, manufs. cotton, muslin, and embroidery. Inner-Rhoden (pop. (1955) 13,400) is especially conservative in the retention of old-world dress and traditions.

2. Cap. of the Inner-Rhoden half of the above canton, Switzerland. It is a picturesque vil., situated on the R. Sitter, which is formed by the union of torrents from the mt Sântis, S. of the vil. The *Landsgemeinde* (see above) is held at A. on the last Sunday in April. The cap. is known for its embroidery work.



Swiss National Tourist Office

STREET IN APPENZELL, SWITZERLAND

Apperception, metaphysical term first introduced by Leibnitz (1646-1716), to denote the spontaneous transformation by the mind of the 'perceptions' of sense into the elements of conscious knowledge. This idea was taken up by Kant (1724-1804), who laid special stress upon the spontaneity of the mental action involved, and introduced the theory of the 'synthetic unity of A.', i.e., the principle that all incomplete knowledge must be capable of falling into place in one complete system. The psychological side of A. has been worked out by Herbart (1776-1841), who emphasised the practical significance of the process, and made the realisation of this the basis of educational theory. The subject received still further attention from Wundt and Stout. See G. W. von Leibnitz, *Nouveaux Essais*, 1765; J. F. Herbart, *Psychologie als Wissenschaft*, 1824-5; G. F. Stout, *Analytical Psychology*, 1896; W. Wundt, *Principles of Physiological Psychology*, trans. 1904.

Apperley, Charles James (1779-1843), Brit. sporting writer who used the

pseudonym Nimrod. Educ. at Rugby, he was a cornet in the dragoons, but later took to writing and joined the staff of the *Sporting Review*. His best-known works are *Nimrod's Hunting Tours*, 1835, *The Chase, the Turf, and the Road*, 1837, *Memoirs of the Life of the Late John Mytton*, 1837, and *The Life of a Sportsman*, 1842.

Appian Way, anct Rom. road, built in 312 BC by the censor Appius Claudius Caecus to consolidate the conquest of Samnite ter. It ran from the Porta Capena at Rome to Capua (132 m.), and the skill with which it was taken through difficult country is remarkable. By 244 BC it had been extended to Brundisium via Beneventum (234 m.). Much of the old work remains, and the first few miles are lined with pagan and early Christian tombs. Horace, in his first satire, described a journey along the A. W., which was also followed by St Paul (Acts xxviii. 15). Trajan varied its last stage with a new road, the Via Traiana, from Beneventum to Canusium. The 19 m. from Forum Appii across the Pomptine marshes was improved by Nerva, Trajan, and Theodorici, as also by Pope Pius VI who built a new A. W. from Rome to Albano.

Appiani, Andrea, the Elder (1754-1817), fresco painter of Milan. He modelled himself on Correggio, and was thought in his frescoes 'Amor and Psyche' at Monza, and others in the royal palace at Milan, to have almost equalled his master. His prosperity ended with that of his great patron, Napoleon I.

Appiani, Francesco (1702-92), distinguished fresco painter of the 18th cent. b. Ancona. He was employed by Benedict XIII at Rome, but he lived chiefly at Perugia, where he continued to paint with unusual vigour in extreme old age. He painted, according to Lanzi, many pictures for Eng. commissions.

Appiano, It. family who fl. in the Middle Ages. Jacopo d'A. was secretary to Pietro Gambacorta, who made him Chancellor of Pisa. He killed Gambacorta and his 2 sons, 1392, and acquired Pisa, which was retained until his son sold it to the Visconti of Milan about 1400. Piombino, however, was retained by the family until 1589, when Alessandro, the last possessor, was killed, and it fell into the hands of Spain.

Appianus (c. AD 90-140), Rom. historian, b. Alexandria. Here he attained high office, but settled in Rome c. AD 100, and practised as an advocate. At the same time he compiled in Greek a list, in 24 books, only 11 of which have survived to form a most valuable source for the period. Entitled *Rōmaika*, it was really a series of monographs narrating the hist. of various peoples and countries down to their incorporation in the empire. See the text and trans. by H. White (4 vols., Loeb Library), 1912-13.

Appin, mountainous dist. of Argyll, Scotland, between Loch Leven, Linnhe, and Creran. This beautiful dist. plays an important part in Stevenson's *Kidnapped*.

Appius Claudius, see **CLAUDIUS**.

Apple, spurious fruit, or pseudocarp, of the species *Malus pumila* of the Rosaceae. It has been cultivated for many ages and in many lands; Homer speaks of its presence in the gardens of Alcinoüs and Laertes, while, according to the phrase of Horace, a Rom. banquet lasted 'ab ovo usque ad mala,' from the egg to the A. It is a spurious fruit because the calyx-tube swells up to form the fleshy part. The *pips* are the seeds, and the pseudocarp is called a *pome*.

Apple, Love, see **TOMATO**.

Apple of Sodom, or **Dead Sea Apple**, the fruit of a tree said to grow on the shores of the Dead Sea. The legend avers that it looks like a tempting fruit, but when plucked is found full of ashes. Thus 'like an apple of Sodom' has come to signify disillusion.

Appleberry, see **BILLARDIERA**.

Appleby, bor. and market tn. cup. of Westmorland, England, on the R. Eden. Though an important stronghold in Norman times, it suffered greatly from attacks by the Scots (1174 and 1388) and never regained its former status. During the Civil war A. Castle was held for the king by Anne, Countess of Pembroke. Pop. 1704.

Appleton, Sir Edward Victor (1892-), physicist, b. Bradford, Yorks, studied at Cambridge and was prof. at King's College, London (1924-36), and at Cambridge, (1936-9). Secretary of the Dept of Scientific and Industrial Research (1939-49). Principal and Vice-Chancellor of Edinburgh Univ. from 1949. In 1924, together with S. J. Barnett, A. devised and made the experiment which proved the existence of the Kennelly-Heaviside reflecting layer in the upper atmosphere. They located the position of this layer in the upper atmosphere by radio-waves. The experiment was, therefore the first example of the location of an 'object' by radio waves—or, in other words, by radio-location. The technique was subsequently developed and used for the location of aircraft. In further experiments A. in 1926 showed that there was an additional reflecting layer, now known as the A. layer, at a height of 150 m. above the ground, which was electrically stronger than the Kennelly-Heaviside layer, and was the reflecting agent which enabled short radio waves to pass round the world. He was elected F.R.S. in 1927, created K.C.B. in 1941, and awarded the Nobel prize for physics in 1947.

Appleton, city, co. seat of Outagamie co., Wisconsin, U.S.A., on the Fox R. N. of Lake Winnebago, in dairying, livestock area. It manufs. paper, machinery, and woollen goods, and is the seat of the Lawrence College (opened 1853) and the Institute of Paper Chem. (1929). Pop. 34,000.

Applied Biology, term limited to those agric., veterinary, and medical practices which have arisen either through the application of some general principle of the science of biology, or as a result of specific research; it does not normally

include human or domestic animals as main objects of study, except where their relation to other living forms, such as parasites, vectors of disease, etc., is concerned. Thus the rotation of crops—a practice found empirically to improve yields, and in general use since the 18th cent. is not A. B., for the causes of improvement were not recognised until later; the much more recent practice of specific choice of crop succession, either to cause periodic deprivation of the sole food of a pest and thus, its demise, or because of particular mineral constituents of the soil, is A. B., for the method has been devised from scientific knowledge of the requirements of the animals and plants involved. Unlike the physical sciences, where industrial needs, and indeed, industrial research, have provided scientific information for many decades, and where pure and applied sciences are inextricably interwoven, the hist. of biology (q.v.) and the nature of the subject, have been such that only recently have generalisations emerged which could form the basis of applied method; yet A. B. is now a rapidly expanding industry, chief of its activities being pest control—the design of methods for removing, decreasing, or preventing popa. of unwanted animals and plants. Three types of method are in regular use: (1) chemical control, by weed-killers, insecticides, fungicides, etc., in which A. B. provides information on optimal conditions, and dosages, etc., and on the differential application of pesticides as between useful, and unwanted or harmful, organisms, though it must be appreciated that the discovery of such chemicals is still essentially from trial and error methods—not from prediction; (2) biological control, by the introduction or encouragement of predators, parasites, or diseases of the pest, as, for example, the use of viruses against the cabbage white butterfly, or the encouragement of capsid bugs which live on the fruit-tree spider mites; (3) cultural control, as exemplified by crop selection, or by burning corn stubble, to destroy over-wintering resting stages of pests before ploughing.

Special branches of A. B. are concerned with the protection of stored products (foodstuffs, timber, leather, etc.), with disease vectors, such as mosquitoes, tsetse flies, with riv. pollution and the effects of industrial and domestic waste on sewage processes, with fisheries (q.v.) and with the breeding of strains of plant and animal with specific properties or disease resistance, or for special climatic conditions (see **GENETICS** and **HEREDITY**, etc.).

The particularly important problems in A. B. to-day are the emergence of strains of insect resistant to insecticides, which is severely affecting the work of the World Health Organisation; the incidental effects of chemical control, such as killing pollinating insects, and the unforeseen changes in the balance of pops. through the killing of a few component members; the introduction of pests and diseases to new terr., especially through the agency of air transport, where the time for journeys can be shorter than the ephemeral life of the

organism or vector; the artificial control of seed dormancy and germination by light or other climatic treatment; the artificial culture of plants, particularly algae, as a most efficient method of using sunlight energy for additional food supplies (see HYDROPONICS). See also BIOLOGY and EUGENICS.

Appoggiatura (It. *appoggiare*, to lean on), short musical note used as an embellishment, and having no time-value. The time of the long A. is taken from the note which follows it; it is given its marked value, and the succeeding note takes what remains of its own face value. It originated in the desire of old composers to hide a suspended note and soften its appearance of dissonance to the eye, but became obsolete about the time of Beethoven. The short A. is a grace-note written with an oblique stroke through the stem.

Appointment, Power of, see POWER.

Appomattox Courthouse, vil. in Appomattox co., Virginia, U.S.A., where the Confederate army under Lee surrendered to the Federals under Grant on Sunday, 9 April 1865, and ended the Civil war.

Apponyi, Count Albert (1848-1933), Hungarian statesman. He became a Liberal in 1899, but left the party 4 years later and became leader of the National party. In 1906, as Minister of Education, his work had a profound effect on Hungarian culture. After the Communist revolution he was commissioned by the Entente to form a gov. in Hungary, but failed to secure agreement between the different parties. A. was chairman of the Hungarian peace delegation, 1919. See *The Memoirs of Count Apponyi*, 1935.

Apportionment signifies generally a sharing in due proportion, as in the allocation of benefits, damages, liabilities, etc. In law the regulations concerning A. are so numerous and complicated that special Acts to systematise them have repeatedly been passed in Great Britain, the colonies, and the U.S.A. They fall under 2 main heads: (1) A. in respect to estate; (2) A. in respect to time. Property bequeathed on trust under certain conditions is governed by what is called *equitable A.*

A. Bills are passed in the U.S.A., one after every census, to determine the ratio of representation for each state in the coming decade; the states themselves also make similar regulations for their own legislatures. This system has often been greatly abused for party purposes.

Apposition. In grammar, when a noun or noun-clause is used to explain a noun or pronoun in the same case, they are said to be in A.; thus 'John the Baptist was beheaded,' 'He, the chief culprit, escaped.' Here 'the Baptist' and 'the chief culprit' are nominatives in A. to 'John' and 'he' respectively. Again, 'Alexander killed Clitus, his friend'; here 'friend' is objective in A. to 'Clitus.' In the possessive case the apostrophe is added to the second noun, as 'William the Conqueror's army.'

Appraisalment, legal term meaning valuation, such as may be required for purposes of sale, distress, mortgage,

assessment, compensation, or probate. Any person undertaking the work, unless he is a licensed auctioneer or house agent, must take out an appraiser's licence, the penalty for default being £50. He is liable to the person employing him for any loss arising through negligence or want of skill on his part.

Apprehension, in psychology, term which serves to point the distinction between the act of thinking and the object of the thought. The object of thought can only be described by means of propositions capable of being asserted, denied, or assumed. If, for instance, the thought takes the form of believing, it is clear that we cannot 'believe' the event as such, but we must believe some proposition concerning that event. Again, when we are said to 'know' something, this expresses the fact that we know that something is or is not the case. From this it is evident that the object of thought holds an identity in our consciousness which is independent of both time and change. Events begin and cease; but what the mind *apprehends* is not the mere event as it occurs, but the 'fact' that it does occur. Thus, the Great Fire of London began and ended in 1666, but the fact of its occurrence in that year is not limited by temporal conditions; that it happened in that year is a *fact at the present moment*. In the language of psychology, the distinction is between the act of thinking, which is an event in our own mental hist., and the object which has the same meaning whenever it is apprehended. The acts of thinking and apprehending are distinct occurrences in the time order of our conscious life. I can apprehend the Great Fire repeatedly on different occasions; but on each separate occasion my act of A. is a separate one. As a corollary of this position, it is evident that the object itself can never be identified with the present modifications of the individual consciousness by which it is 'cognised.' Again, there is said to be 'implicit A.' when anything is apprehended in the act of apprehending a whole of which it forms a part, without being separately distinguished as a constituent of this whole. Thus, in glancing at a clock, I am distinctly conscious of the clock face as a whole, but not separately of the shape of each individual numeral which it contains; or again, in listening to a band, I may clearly apprehend the combined sound as a confused mass without differentiating the sev. tones produced by the various instruments. Such implicit awareness has been called subconscientiousness as distinguished from clear conscientiousness. Consult James Rowland Angell, *Psychology*, 1905, and G. F. Stout, *A Manual of Psychology* (4th ed.), 1929.

Apprentice, one who is contracted to a master for a period to be taught a trade or profession; in return he gives his services, and usually a premium is paid. The system is traced back to the 13th cent. when it applied to *all* trades and professions, even students being indentured to study for their degrees. Barristers were technically A.s for 16 years, but for

most arts and crafts the term was 7 years, this period being made universal and compulsory in the reign of Elizabeth. Difficulties and anomalies arising later led many to question the value of this arrangement, and after much argument, in which Adam Smith in his *Wealth of Nations* took a leading part, Parliament decreed in 1814 that trades and handicrafts should be thrown open to non-A.s also. Of late years, owing to many causes, such as the increased subdivision of labour, trade union restrictions, etc., the number of apprenticeships has so decreased as seriously to affect the supply of thoroughly trained workmen.

Since an A. is generally a minor, the contract is signed on his behalf by a parent or guardian. It must always be stamped, except in the cases of parish and ships' A.s. The A. must work on any day his master requires, except Sunday, and must not enter upon any engagement which might interfere with his duties without the employer's consent. The master must supply proper training and indoor A.s must be provided with food and medical attendance. He cannot discharge an A. without grave cause, such as serious misconduct or permanent disablement. The agreement is at an end if the master dies or becomes bankrupt, and it may be concluded by mutual consent.

Approaches, in warfare, trenches dug by besiegers to protect them in gradually working their way nearer to the line of fortification. Introduced into Europe by the Turks in the 15th cent.

Approbate and Reprobate, Scottish theological term corresponding to the Eng. 'doctrine of election,' i.e. predestination to heaven or to hell.

Appropriation (from Lat. *appropriare*), setting aside of money or other property to be applied exclusively to one use.

In civil law, a debtor who owes separate amounts to the same creditor is entitled when making a payment on account to allocate the money as he likes in respect of the different debts. If he pays it in without making any such stipulation the creditor can appropriate it as he chooses, even to the payment of a debt which has been allowed to lapse. If there has been no selection by either, the law generally gives the preference to earlier rather than later debts.

In constitutional finance, both in Parliament and, in the U.S.A., Congress, special Appropriation Acts are passed every session to authorise payments by the Treasury of sums required for the public service, as set forth in estimates presented to and passed by the House.

Approved Schools, Reformatories, and Industrial Schools. A. S. provide places of training for children and young persons who appear before the courts and who need to be removed from home for a long period. They have developed from the old Reformatory and Industrial Schools. The first Reformatory was estab. in 1788 by the Philanthropic Society, but it was not until 1854 that young offenders could be committed to the Reformatories by the courts. Even then a term of imprison-

ment of at least 14 days had to be served first. Under the Reformatory School Act, 1893, the passing of a preliminary prison sentence was made optional and in 1899 was prohibited. Industrial Schools were estab. in 1857 for children who were found homeless or begging or beyond control. In 1861 they were allowed to accept children under 12 who were delinquent. In 1908 the supervision of both Reformatories and Industrial Schools became the responsibility of the Children's Branch (now the Children's Dept.) of the Home Office.

Until the Children and Young Persons Act, 1933, became law, the Industrial Schools took delinquents under 12 and children up to 14 in need of care or protection. Delinquents over 12 were sent to Reformatories. There was no power to commit young persons over 14 in need of care or protection or beyond control. Under the 1933 Act both types of institution were replaced by A. S. and the courts were empowered to commit care and protection and beyond control cases whether children or young persons were involved. The schools are divided into senior, intermediate, and junior and according to the sex and in some cases the religion of those committed.

Though the schools are inspected and have to be approved by the Home Office, and are almost entirely financed by grants from public funds, most are still controlled by philanthropic and religious organisations, though some come under the local education authorities. Since 1948 the appointment of the headmaster or mistress has to be confirmed by the Home Office.

The period of committal is in general for 3 years, except that none can be kept after 19 years of age and that children under 12 plus 4 months can be kept until they are 15 plus 4 months. Children or young persons committed to an Approved School can be released on licence at any time after 1 year, but until the expiration of the full term of their committal the school can direct where they shall live and has considerable powers of control, and they can be recalled at any time if their behaviour warrants it. The period of licence is followed by a period under supervision during which they are under the care of the school, though less subject to control. This lasts for a further 3 years except that it cannot be continued after the age of 21. Absconders who are over 16 can be committed by a court of summary jurisdiction to Borstal (q.v.).

The aim of the Approved School is definitely educational and not punitive, and the general atmosphere is very different from that of the earlier repressive Reformatory. All are in open buildings, though closed blocks have recently been added to 2 A. S. for persistent absconders.

Since they are controlled by organisations of varying points of view, there are inevitably considerable variations in the character of the individual schools, and the type of technical education given also varies. Selection of the most suitable

Approved School therefore becomes important. To meet this a system of classifying schools for the boys and senior girls has been built up and now covers the whole country outside of London. Except in London and with the younger girls, the courts can only commit directly to a school run by the local education authority for that area. All other cases go first to a classifying school.

At the end of 1954 there were 127 schools of which 26 were under the local education authority. There were 88 for boys and 39 for girls. Owing to the reduction in the extent of juvenile delinquency 28 schools were closed between the beginning of 1950 and the spring of 1954. In 1955, 2598 boys and 243 girls were committed for offences, and a further 156 boys and 357 girls as being in need of care or protection or beyond control. It will be noted that with the girls this latter group exceeds the numbers of delinquents. This applies particularly to the senior girls and includes those who are in need of care because they have shown themselves to be sexually promiscuous. See J. Watson, *The Child and the Magistrate*, 1950; M. M. Simmons (Home Office), *Making Citizens*, 1954; W. A. Elkin, *English Penal System*, 1957.

Approved Society: 1. A friendly society approved by law for the purposes of the National Health Insurance Acts prior to that of 1946. See NATIONAL INSURANCE.

2. A society registered under the Industrial and Provident Societies Acts (1893-1923), or the Friendly Societies Acts (1896-1924), one of whose chief objects is the provision of allotments, and which is restricted by its constitution as to the rate of interest on its share and loan capital and the distribution of profits among its members.

3. A registered company the constitution of which prohibits the issue of any share or loan capital with interest or dividend exceeding the rate laid down by Treasury regulations.

Approver. By the old Eng. law, when a person who had been arrested, imprisoned, and indicted for treason or felony confessed the crime charged in the indictment, and was admitted by the court to reveal on oath the accomplices of his guilt, he was called an A.

Approximation, see FINITE DIFFERENCES.

Apricot, well-known fruit, a drupe, of the *Prunus armeniaca*, a species of Rosaceae. It is related to the cherry, almond, peach, and plum, and is largely cultivated in Europe.

Apries, Egyptian king, the son of Psamtik II and 4th king of the 26th dynasty. In Heb. hist. he is known as Pharaoh Hophra (Jer. xlv. 30). He succeeded his father in 588 bc and reigned 21 years. He occupied Phoenicia, but failed to save Jerusalem when besieged by Babylonians. His army, sent against the Greeks of Cyrene, was defeated, and this circumstance caused a nationalist revolt under Amasis, whom they asked to be king. A. was defeated and slain 568 bc

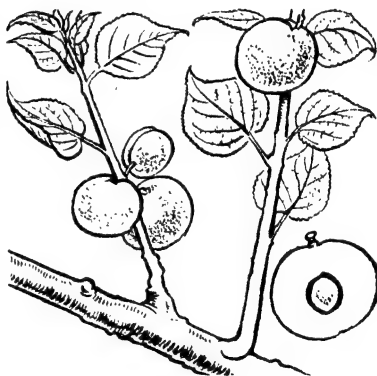
and was buried at Sais. See Herodotus, ii. 161-3 and 169; iv. 159.

April, fourth month of the year, consists of 30 days, which was the number said to have been assigned to it by Romulus. Numa Pompilius gave it 29; but Julius Caesar gave it 30, which number it has since retained. In the original Alban or Lat. calendar A. consisted of 36 days and was the first month. The Rom. name was Aprillis, from *aperire*, to open; either from the opening of the buds, or of the bosom of the earth in producing vegetation. The A.-S. name was *Eostre*- or *Eastre-monath*.

Apron. Original meaning of a protective outer garment has been extended to cover various engineering devices used to shelter certain parts of a mechanism. Thus it is used of a rectangular piece of lead which covers the vents of cannon; of a piece of curved timber above the forward end of the keel of a ship; of a protective platform at the base of machines, etc.

Apsaras, in Hindu mythology race of female water-sprites, somewhat resembling the Germanic swan-maidens, who appear in the Gandharvas legends.

Apse, semicircular or polygonal termination to or prolongation of a church or other building, more common on the Continent than in England. Besides the A. at the E. (or W.) end, others have sometimes been added, e.g. at the ends of transepts. A.s are frequent in Byzantine and Romanesque churches, and in ancient Rom. basilicas.

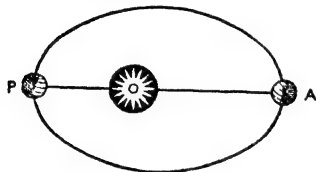


APRICOT

Apscheron, peninsula in the Caspian Sea at the E. end of the Caucasus Mts. The large Baku oilfields and Baku city are situated here.

Apsides. Many heavenly bodies, such as planets, comets, and meteors, move round their primaries in elliptical orbits, and the 2 points in that orbit which are at the greatest and least distance from the central body are known as A. The point most distant is called aphelion, that

least distant perihelion (the corresponding terms in relation to the moon are apogee and perigee). This 'line of A.' is the major axis of the ellipse. This line, owing to the attraction of other bodies, is always shifting forward (in the case of the earth and all the planets except Venus, where the motion is retrograde), gives rise to what is known as the anomalistic year, i.e. it takes the earth 4 min. 43 sec. longer than the sidereal year to return to its perihelion. Perihelion and Aphelion are shown at P and A respectively in the diagram. See APOGEE; PERIGEE; PERIHELION.



APSIDES

Apsley House, mansion at the SE. corner of Hyde Park, London, originally built in 1771-8 for Baron Apsley, 2nd Earl Bathurst, from designs by the Adam brothers. It was bought in 1820 by the Duke of Wellington from his brother the Marquis Wellesley, and in it he held the commemorative Waterloo dinner annually until his death. The house was enlarged about 1828 by Benjamin Wyatt, and has a remarkable interior. It used to be known as 'No. 1, London.' The house and its contents were presented to the nation by the 7th Duke of Wellington in 1947, and after restoration due to severe damage in the Second World War it was opened to the public as the Wellington Museum. It contains art treasures and many memorials of Wellington.

Apsyrus, see ABSYRTUS and ARGO-NAUTS.

Apt (anot **Apta Julia**), Fr. fn, cap. of an arroyo, in the dept of Vaucluse, on the Calavon. It has a fine church (partly 12th cent.), and is the centre of a region in which ochre quarries are found. Pop. 6300.

Apta Julia, see **APT**.

Apertal (Gk *a*, without; *pteron*, wing), type of temple which has prostyles, but not columns along its flanks. Few Gk temples followed this fashion, but most Rom. rectangular temples were A. prostyles.

Apterygota, or **Aptera**, wingless insects. They differ from such insects as wingless ants, which have winged relations and ancestors. In this group there are only 3 orders, the Collembola, Protura, and Thysanura. The best-known species in Britain belongs to the last order, and is *Lepisma saccharina*, the silver-fish, found in kitchens.

Apteryx (Gk *a*, without; *pteryx*, wing), or **Kiwi**, bird found only in New Zealand, is a ratite bird of the family

Apterygidae. The tail and wings are minute and useless, the feathers are hair-like, the beak is long and weak. It is about the size of a hen, is nocturnal, insectivorous, and lays a single large-sized egg.

Apuan Alps, branch of the Etruscan Apennines (q.v.) in NW Tuscany (q.v.). They are 30 m. long, and fall steeply to the coastal plain of the Ligurian Sea (q.v.). The highest point is Mt Pisanino (6382 ft.). They are noted for beautiful white marbles (see CARRARA and MASSA).

Apuleius, Lucius (b. c. AD 125), Rom. satirist and rhetorician, b. Madaura, N. Africa, was the son of a wealthy magistrate. He studied at Carthage and Athens, and showed a preference for the philosophy of Plato. After the death of his father he used the great riches left him to travel, and went to Italy and Asia. The outcome of this journey was a satire *Metamorphoses* (*The Golden Ass*), a prose romance purporting to narrate the experiences of one Lucius, whom an enchantress had changed into an ass. Justly described as the 'parent of modern romantic literature,' it is veritably 'a gallimaufry of intrigue, sorceries, bickerings, and ravishments, savoured with gaiety and humour, told at the topmost pitch of skyscraping spirits.' The finest part is the graceful tale of Cupid and Psyche, which has been pub. separately more than once. In 155 A. married a wealthy widow, and was accused by some of having gained her by witchcraft. His *Apologia sive Oratio de Magia* is a fine piece of work. He also wrote two philosophical essays, *De Deo Socratis* and *De Mundo*. The best ed. of *Metamorphoses* is that of R. Helm, 1907, brilliantly trans. by Robert Graves (Penguin Books, 1952). Helm's ed. of the *Apologia* has been trans. by H. E. Butler, 1910, and there is an ed. of the *De Mundo* by P. Thomas, 1908.

Apulia (It. *Puglie*), region (*compartimento*) of SE. Italy, comprising the provs. of Bari, Foggia, Lecce, Brindisi, and Taranto (q.v.). It is bounded N. and E. by the Adriatic, NW. by Abruzzi e Molise. W. by Campania and Basilicata, and S. by the Gulf of Taranto (q.v.). In ant. times A. was inhabited by sev. peoples, as the Apuli, the Messapii (see IAPYGTIA), and the Daunii (q.v.). It was conquered by the Romans in 317 BC; the extreme SE. was the Rom. Calabria (q.v.). The Second Punic War (see CARTHAGE) was partly fought here, and the battle of Cannae (q.v.) took place within its borders. Subsequently it came under the power of the Byzantine Empire (q.v.), the Longobards (q.v.), the Byzantines again, the Normans (q.v.), and finally the crown of the Two Sicilies (see SICILY). The N. and the S. (the 'heel' of Italy) are plains, the N. plain containing the isolated mt mass of Gargano (q.v.). The centre has ranges of the S. Apennines (q.v.). There are mineral deposits (bauxite, salt), and tobacco, wine, olives, almonds, and figs are produced. The chief tn is Bari. Area 7462 sq. m.; pop. 3,340,000.

Apulum, see ALBA IULIA.

Apure, riv. in Venezuela which rises in

the E. Cordillera of Colombia and flows into the Orinoco. The chief towns on its banks are San Fernando and Nutrias (port). Its course is about 500 m., and it is navigable for just over half that distance.

Apurimac, riv. in Peru which rises in the Andes in the prov. of Arequipa. After a N. course of about 600 m. it joins the R. Urubamba to form the Ucayali, and finally the Amazon. It also lends its name to the dept., which has an area of nearly 8200 sq. m. (pop. 333,900). The cap. is Abancay, and it yields rubber, rice, and cotton, having also excellent grazing land for cattle-breeding.

Apus, or the **Bird of Paradise**, constellation in the S. hemisphere. Its three brightest stars are of 4th magnitude and orange coloured, and its most westerly one is due S. of Alpha Centauri.

Aqabah: 1. Tn on the E. side of the Gulf of A., which has been identified with the biblical Elath. It is on the pilgrim route from Egypt to Mecca. It is now the port of Israel.

2. A gulf formed by a branch of the Red Sea between the peninsula of Sinai and the N.W. of Arabia. It is the ant. Sinus Aclanticus.

Aqua Regia, mixture of concentrated nitric acid with 4 times its vol. of concentrated hydrochloric acid. It derives its name from its capacity for dissolving the so-called 'noble' metals, such as gold and platinum, which are unaffected by most solvents.

Aqua Tofana, liquid poison invented by a woman named Tofana in the 17th cent. It was tasteless, colourless, and very deadly, even in small quantities. It was sold in Rome and Naples by her daughter. The ingredients have never really been discovered, but it is supposed to have been composed largely of arsenic and lead.

Aqua-vitæ (Lat., 'water of life'), the elixir of life of the alchemists who discovered distillation. They identified it with the distilled quintessence of wine, but in Fr. *eau-de-vie* applies to spirits distilled from other substances than wine. In Gaelic its equivalent *uisge beatha* provides the derivation of whisky.

Aquæ Bignororum, see BAGNERES-DE-BIGNORRE.

Aquæ Bilbilianæ, see BILBILIS.

Aquæ Calidæ, see VICHY-LES-BAINS.

Aquæ Coloniæ, see CALDAS DE REYES.

Aquæ Mortuæ, see AIGUES MORTES.

Aquæ Pannoniæ, see BADEN-BEI-WIEN.

Aquæ Patavianiæ, see ARANO TERME.

Aquæ Perennæ, see ÉPERNAY.

Aquæ Sextiæ, see AIX-EN-PROVENCE.

Aquæ Statiellæ, see ACQUI.

Aquæ Urentæ, see ORENSE.

Aquafortis, old name for nitric acid (q.v.).


Aqualung, used in free-diving for exploration of under-sea archaeological sites, salvage work, etc., consists of one to three bottles of compressed air connected with a mouthpiece and fitted on the diver's back by harness equipment. Goggles cover the eyes and nose; rubber fin-paddles are fitted to the feet to aid

propulsion, while rubber suits may be worn as a protection against cold. See ARCHAEOLOGY, *Undersea Archaeology*.

Aquamarine (Lat. *aqua*, water, *marinus*, pertaining to the sea), a sea-green or bluish-green variety of beryl which is used as a precious stone. It is found in N. and S. America and in Australia.

Aquarium (Lat. *aqua*, water), small reservoir of fresh or salt water in which aquatic animals and plants are kept for scientific purposes, or for amusement. Large aquaria are to be found in places such as zoological or botanical gardens and laboratories in which biology is studied.

Owing to the placidity of the water and air, an A. is difficult of aeration; artificial fountains, the presence of green plants, and the action of pouring water from a height are all beneficial. In a salt-water A. the green alga of the genus *Ulva* grows readily, while duckweed will flourish in fresh water. The amateur natural historian will find sticklebacks, minnows, newts, tadpoles, axolotls, and water-snails thrive under his care, but generally fish are difficult to preserve alive. Goldfish, sun-fish, thunder-fish, and catfish frequently are denizens of aquaria, but they are liable to be attacked by a fungus disease which usually proves fatal. Insufficient aeration and decaying food will cause a white, film-like substance to cover their bodies, hamper their movements, infect their neighbours, and work speedy havoc among them. It may sometimes be removed by placing them in water in which salt has been dissolved, or by gentle application of a soft paint-brush when the patient is under running water. The *Triton cristatus*, a large newt, is a hardy, carnivorous amphibian which requires a large receptacle, and at certain periods of the year prefers to live on land. See E. G. Boulenger, *The Aquarium Book*, 1925, and G. C. Bateman, *Fresh Water Aquaria*, 1936.

Aquarius, or the **Waterbearer**, group of stars forming the eleventh sign of the zodiac (q.v.). This constellation is supposed to bear a resemblance to a water-bearer, hence its name and its hieroglyph . The sun enters the sign of A. on 21 Jan. The origin of the name has been traced by some to the fact that the Nile rises during the month of A., whilst others attribute it to the rainy season in India. No star in A. is brighter than the third magnitude, but it includes some interesting double stars, a fine star-cluster, and the 'Saturn' nebula.

Aquatic Animals is a vague and wide term applied to animals which cannot exist without water, to amphibians which take to it on occasions, and to animals which are also perfectly at home on land; it includes those which respire air by means of lungs, or water by means of gills, vibratile cilia, or any other apparatus. They are distributed over the whole world.

Most of the lower invertebrates are truly aquatic; sea anemones, jelly-fish, many of the annelids, even earthworms, and crustacea, such as crabs and lobsters, cuttle-fish, molluscs, such as mussels

and cockles, with the exception of some gastropods, would perish if exposed to the sun and deprived of water. Among vertebrates fish are exclusively formed for inhabiting a fluid medium; they breathe by gills, are covered with scales, their form is elongated and compressed, the eye is suited to the dense medium of the water, they balance themselves on fins, and the laterally compressed tail serves as a paddle. Among reptiles, crocodiles and turtles may be regarded as truly aquatic; they breathe air, however, and come on land to lay their eggs. Nearly all aquatic birds (except, e.g., the water-ouzel) have webbed, oared, or lobated feet, as grebes, auks, puffins, razorbills, geese, ducks, pelicans, gannets, and gulls; the penguin is as awkward on land as a seal, and as much at home in the sea. Among mammals the whales and porpoises are most truly aquatic, having a smooth and oily skin, a layer of blubber covering the internal viscera, and they are constructed to permit a long cessation of respiration while submerged; walrus and seals obtain their food in the sea, but breed and repose on rocks; their forelimbs are formed into paddles, the hind limbs are placed far back and are also paddles or oars, and every part of their internal structure is saturated with oil. Other aquatic mammalia are usually only web-footed and visit the water for prey (e.g. the otter).

Aquatic Plants are known in botany as *Hydrophytes* (Gk *hudōr*, water; *phuton*, plant). The *Hydrophytes* form a large group of flowering plants, and differ from *Geophytes*, which are rooted in the soil, and *Epiphytes*, which use other plants for support, chiefly because they dwell in the water. There are, however, many incidental peculiarities of structure and pollination in *Hydrophytes* which are not present in their *geophyte* relations, and when transplanted to soil become extinct. They are not influenced by changes of temp. to such a degree as their earth-grown neighbours, hence many of them are perennial. They frequently form winter-buds, which hibernate at the bottom of the water and develop in the early spring (e.g. *Utricularia*, or bladder-wort, and *Potamogeton*, or pond-weed). Besides this asexual reproduction there is the ordinary sexual reproduction common to flowering plants, many of the flowers being above the water and pollinated by insects or the wind; sev., e.g. *Zostera*, or eel-grass, have submerged flowers, of which the pollen grains are thread-like, and float at any depth of water until finally they reach a large stigma and so come to rest.

An interesting feature of these plants is their heterophyllous condition, for there are no fewer than 4 types of leaves observable in them. Those which live beneath the surface are not cuticularised, and are devoid of stomata, the latter confined to the upper surface, whereas in mesophytes they are usually more numerous on the lower surface, while those which float on the surface have both cuticle (generally of a waxy nature)

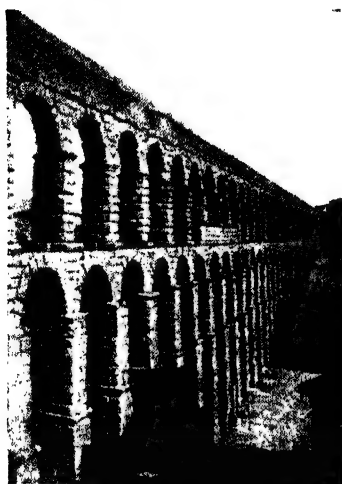
and stomata. The 4 types are: (a) ribbon leaves, (b) much-divided leaves; (c) awl-shaped leaves; and (d) entire, rounded or lobed surface leaves. The ribbon leaves are found in plants which grow in running water, e.g. *Zostera*; the much divided leaves occur in still-water plants, e.g. *Ranunculus aquatilis* or water crowfoot; the awl-shaped leaves are also submerged, and are found on plants which usually can also grow on land, e.g. *Subularia*, or awl-wort; the floating leaves have large and conspicuous air-spaces, as exemplified in such plants as *Nymphaea*, or white water-lily, *Nuphar*, or yellow water-lily, and also *Ranunculus aquatilis*. Air spaces are also common in the stem. The slimy nature of the hydrophytes is caused by a mucilaginous secretion from surface glands or hairs; the fibrous and vascular tissues are developed to a very slight extent.

Among other interesting A. P. may be mentioned *Elodea*, or Canadian water-weed; *Typha*, or bulrush (also known as cat-tail); *Nelumbium*, or sacred lotus; *Ceratophyllum*, or hornwort; *Sagittaria*, or arrow-head; *Nasturtium officinale*, or water-cress; *Iris pseudacorus*, or yellow flag; *Lemna*, or duckweed; *Stratiotes*, or water soldier. Among these are included a few plants which have their roots in water and the shoots in the air, e.g. the bulrush, and these are often classified as marsh plants. The algae are treated of in a separate article. See J. C. Willis, *Flowering Plants*, 1908; Agnes Arber, *Water Plants*, 1920; Frances Perry, *Water Gardening*, 1939.

Aquatint, means of etching on copper or steel to produce pictures in imitation of sepia and Indian ink drawings. The effects are obtained by the action through a porous ground of sand or some thin resinous solutions, on copper sheets. It was invented in the 18th cent., and sometimes used for colour (see COLOUR PRINTING), as well as black-and-white prints, but is little used to-day, though interesting efforts to revive it have recently been made in France. M. Roger Lacouëre has employed an old trade technique (the 'sugar process') and by this means has reproduced drawings by Clouet (in colour) for the Bibliothèque Nationale, as well as paintings by Picasso and Poussin. Picasso used this process in his illustrations to Buffon's *Histoire Naturelle*, 1942. John Piper's series of *Brighton Aquatints*, pub. in 1940, is an Eng. example.

Aqueduct, artificial conduit or channel for the conveyance of water, the term being usually applied to an open channel rather than pipes. A.s were made on a large scale by the Egyptians and Babylonians, while some of the anc. Gk and Rom. A.s are used to this day. Most of the former are subterranean, and wonders of engineering skill, but perhaps this mode of getting water from the hills to the towns was most extensively employed by the Romans. Rome itself was supplied by 9 A.s, which brought the water over 60 m., and in some places were built nearly 200 ft. in height. These were formed either by erecting one or more rows of arcades

across a valley and making them support 1 or 2 more level canals, or by boring through mt sides which would have interrupted the watercourse. In AD 741 an A.



AQUEDUCT AT SEGOVIA

having 10 pointed arches of 70-ft span was built at Spoleto by Theodoric, King of the Goths.

Ruins of A.s can be found in many parts of Europe, among which may be mentioned the famous one at Pont du Gard at Nîmes. At Metz in France, and at Mainz in Germany, there are also ruins of the same sort. Spain has one at Segovia, and Portugal at Evora, while in Italy these ruins are very numerous.

The Maintenon A., which was begun in 1684 but never finished, is one of the finest structures of this nature in the world, despite its incomplete state. Other A.s of modern times and still in use are the Bridgewater Canal (q.v.) over the R.

Irwell (the first in England), the Croton A., which supplies New York, the Mar-selles A., over 60 m. in length, and also those at Manchester, Glasgow, Birmingham, Bombay, and Vienna. In certain parts of the U.S.A., especially California, there are timber A.s termed flumes, which are frequently carried along steep mt slopes and across valleys, supported on trestles. They are used to convey water for hydraulic mining, for irrigation, and timber transportation. The 3 largest A.s in the U.S.A. are (1) the Catskill, supplying New York, (2) the Owens R., supplying Los Angeles, and (3) the 'Hetch Hetchy' A., completed in 1932, which serves San Francisco. The Catskill has a length of 92 m. (of which 14 m. are tunnel and 23 m. pressure pipes) and a capacity of 500 million gallons per day. The Los Angeles A., which cost about 23 million dollars to construct, has a capacity of 280 million gallons per day and a length of 223 m. The San Francisco A. is 156 m. long, with a capacity of 400 million gallons per day. See also CANAL.

Aqueous Humour, water fluid between the cornea and crystalline lens of the eye. See EYE.

Aqueous Rocks, term applied to rocks which have been deposited under water by the chemical and mechanical action of the water or by organic depositions. They may be made respectively of chemical precipitates, of mineral and rock fragments, or of decayed vegetable and animal matter.

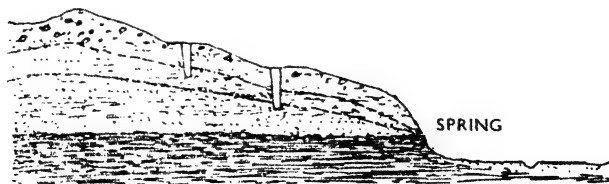
Aquiba (Aqiba), or Akibah, Ben Joseph, called Barakiba by Epiphanius and Hieronymus, lived during the end of the 1st cent. and the early part of the 2nd (c. AD 50-132). He was a disciple and successor of the Rabbi Gamaliel. He joined the standard of the pseudo-Messiah Bar-cochba (q.v.) in Judaea, and when the Emperor Hadrian took Bethara, he ordered that A. should have his skin taken off by an iron comb. He was buried in Tiberias. The authorship of the *Jerirah*, the chief book on cabbalistic doctrines, has by some been ascribed to A.

Aquifer, geological name given to a series of beds from which water can be obtained. The water-bearing properties of rocks vary considerably. A good A. is

GROUND
WATER LEVELS

SOIL

SHALE



UNDERGROUND WATERS

Water and rain and melting snow sink into the soil until arrested by some impermeable bed, such as clay or shale. The level of ground water rises after a wet season and sinks after a dry one, leaving shallow wells without a water supply. Springs occur along the sides of slopes where the top of the impermeable layer is exposed.

both porous, that is, has a high proportion of voids, and permeable. The permeability of a rock is a function of the size of the spaces within the rock. Thus water penetrates but slowly through a clay in which the voids are small, but more readily through a sandstone or gravel where the spaces between the solid particles are larger. Limestone and chalk when fissured are good A.s as the water passes through the cavities so produced. In S. England much water is obtained from underground resources within the Chalk and the Greensand. Farther N. the New Red Sandstone forms an excellent A. Overseas, gravels provide good supplies in many countries, but they are not used for large supplies in Britain.

Aquifoliaceae, family of dicotyledon evergreen shrubs and trees, about 500 species; with leathery, alternate leaves, small, 4-parted, dioecious flowers, and drupe fruits. Chief genera are *Ilex* and *Nemopanthus*.

Aquila, see L'AQUILA.

Aquila (Lat., 'eagle'), constellation situated above and resting on the zodiacal constellations of Capricornus and Aquarius, and to be found due S. at 8 p.m. in the middle of Sept., its brightest star Altair being then about 50° above the horizon in the lat. of London. In the Gk mythology this constellation represented the eagle of Jupiter, and according to some the bird which was the tormentor of Prometheus. A group of stars, now treated as part of A., were named Antinous by order of the Rom. Emperor Hadrian.

Aquila and Priscilla, Jew of Pontus and his wife, who settled in Rome, but left when the Jews were driven out by Claudius (Acts xviii. 2). They were in Corinth when St Paul met them and, as they were of the same trade, lived with them. A. and P. went from Corinth with Paul as far as Ephesus, where they settled down and their house became a Christian meeting place (1 Cor. xvi. 19). Apollos was instructed by A. and P. In Rom. xvi St Paul sends his greetings to them, which indicates that they had returned to Rome and had again made their house a place of Christian worship. The church of St Prisca on the Aventine in Rome is supposed to indicate the site. 2 Tim. iv. 19, however, shows them again in Ephesus. We do not know enough about them to explain or to criticise these movements. Rom. xvi. 4, with its reference to all the churches of the Gentiles as indebted to them, suggests that they were peripatetic in their habits.

Aquila degli Abruzzi, see L'AQUILA.

Aquila Ponticus, relative of Emperor Hadrian, lived c. AD 140, and trans. the O.T. into Greek, aiming, according to Jerome, at a word for word rendering. Part of this version was found in fragments of Origen's *Hexapla*, in two palimpsests, at the beginning of this cent.

Aquilegia, genus of hardy perennials, family Ranunculaceae, of which *A. caerulea*, *A. chrysantha*, *A. formosa*, and *A. vulgaris*, the Columbine (q.v.), and their varieties are popular.

Aquileia, anct tn of Gallia Transpadana,

at the head of the Adriatic, founded by the Romans in 181 BC. A place of great strategic importance, it was also a commercial centre; and in Imperial times its military associations made it one of the prin. seats of Mithraism. In AD 452 A. was taken and destroyed by Attila after a 3-month siege. Many of its inhab. fled to the lagoons where Venice now stands. A new tn was built, but it never regained its former glory. The cathedral dates from the 11th cent. Pop. 2900.

Aquin, tn on S. coast of Haiti, W. Indies, 72 m. SW. of Port-au-Prince. Pop. 1800.

Aquinas, Thomas, St (c. 1226-74) (Thomas of Aquino), one of the most famous of scholastic theologians, known as *Doctor Angelicus*. He was of noble descent, and was b. at the castle of Roccasecca, the property of his father, the Count of Aquino, in the ter. of Naples. He began his education at the monastery of Monte Cassino, after which he studied in the univ. of Naples. While there he came under the influence of the Dominicans, and in spite of violent family opposition was at last permitted to enter their ranks. At the Dominican school of Cologne, whither he was sent, he came under the influence of the greatest teacher in Europe, Albertus Magnus. Later he followed his master to Paris, and was there granted the degree of bachelor of theology. About the year 1248 he returned to Cologne still with Albertus, in the official position of second lecturer. Already the controversy between the univ. of Paris and the teaching friars had broken out, and Thomas had thrown himself with great zeal into the defence of his own order. So great was his zeal that later he was chosen to defend the attitude of the Dominicans before the Pope himself. The hostility of the univ. to the mendicant orders prevented his taking his doctor's degree until 1257, when, together with the Franciscan Bonaventura, he received that degree. Eccles. honours were his practically for the asking, but he refused them all. The popes themselves were beholden to him for advice, and he was held in high regard by Urban IV and Clement III; so great was his love of the religious life that he refused the archbishopric of Naples. In 1263 he visited London to take part in the general chapter of his order. The greater part of his later life was taken up in visits to various potentates and in the duties of his state. He was called again in 1272 to his professional chair at Naples, and 2 years later was summoned by Pope Gregory X to the General Council of Lyons. (I) though he was, he set out, but d. at the Cistercian monastery of Fossa-Nuova on 7 Mar. 1274. He was canonised by Pope John XXII in 1323, and was declared a Doctor of the Church by Pope Pius V in 1567. He is regarded as the patron saint of all Catholic educational establs., and is still upheld as the teacher of the orthodox Catholic faith.

His teachings are equally important from the point of view of the theologian and that of the philosopher, and substantially his writings are regarded as

authoritative by the Rom. Catholic Church. His style is definite, clear, and concise, and the basis of his system seems to have been mainly that the 2 sources of knowledge were the mysteries of Christian faith and the truths of human reason. The mysteries of Christian faith are to be believed because they help even when they cannot be understood. His greatest works are the *Summa contra Gentiles* and *Summa Theologica*.

Bibliography. WORKS: *Opera Omnia*, 25 vols. (Parma), 1862-75; 34 vols., ed. Vivès (Paris), 1871-80. TRANSLATIONS: *Summa Theologica*, 1912-22, and *Summa contra Gentiles*, 1924-9, trans. by members of the Dominican Order; the latter also trans. by J. Rickaby, 1905, under the title of *God and His Creatures*; M. C. D'Arcy (ed.), *Thomas Aquinas: Selected Writings* (Everyman's Library), 1939. LIVES: R. B. Vaughan, *Life and Labours of St Thomas of Aquino*, 1871-2; A. E. Taylor, *St Thomas Aquinas as a Philosopher*, 1924; G. K. Chesterton, *St Thomas Aquinas*, 1933; W. R. O'Connor, *The Eternal Quest*, New York, 1947.

Aquincum, anct Rom. tn, situated near the present city of Budapest (q.v.). The name is said to be a corruption either of 'Aquae quinquæ' (five springs), or of the Celtic *Ak-Ink* (abundant waters). By c. ad 200, A. had become the cap. of Lower Pannonia (q.v.), and Valentinian II (q.v.) was proclaimed emperor in the tn in 375. The extensive ruins of A., standing beside the Budapest-Vienna road, have been excavated, and there is a museum on the site.

Aquino, see AQUINUM.

Aquinum (modern Aquino), anct tn of Latium on the Via Latina, 6 m. W. of Casinum (modern San Germano). Strabo describes it as a Rom. colony and a populous city. It is the probable bp. of Juvenal. Pescennius Niger, one of the competitors for the empire after the death of Commodus (ad 193), was b. at A. The church of Santa Maria della Libera suffered greatly in the Second World War, the roofs of the nave and one aisle being destroyed; the church of San Tommaso was damaged beyond repair. Pop. 2833.

Aquitaine (Rom. Aquitania), a Rom. prov. of Gaul, stretching from the Pyrenees to the Garonne. Augustus added to this the dist. between the Garonne and the Loire. It was conquered by the Goths in the early 5th cent., by the Franks in the 6th cent., and was an independent duchy under the Merovingians (q.v.). The name was corrupted to Guyenne (q.v.) by the 10th cent. Gascony (q.v.), which had become separated, was regained in 1052. A. was united to the Fr. crown in 1137, but passed to England in 1152 through the marriage of Henry II with Eleanor of Aquitaine (q.v.). It was lost to England again in 1452. See also TOULOUSE.

Aquitania, see AQUITAINE.

Aquitanus Sinus, see HISCAY, BAY OF.

Ara (Lat., 'altar'), constellation situated to the S. of the zodiacal sign Scorpio, and so low in the heavens as not to be visible

in Great Britain. In it are 1 or 2 variable stars.

Ara (dimin. of *araraca*, native name), genus of tropical birds, the macaws, of the family Psittacidae, or parrots, and order Psittaciformes. It has a curved and powerful beak, a long tail, and vivid plumage, and can live in captivity. *A. macao* is found in Brazil, *A. militaris* in Mexico.

Arab (Horse). The original home of the A. is unknown. Some think that, like the Barb (q.v.), the A. breed are descended from the 'Libyan' horse; but they were certainly to be found ultimately in the Nejd, Central Arabia, and in the 5th cent. AD were a special breed belonging to the Bedouins. By the 6th cent. the A. tribes were carefully breeding (or in-breeding) from them, and the purest breeds are still to be found in the Nejd. They were a decisive factor in the conquests of the Mohammedan Saracens, and in the course of centuries these A. horses developed into the superb strains which eventually improved the standard of light horses throughout Europe. Only a small proportion of horses bred in Arabia are pure A.s, and these are known as the Kohl (antimony) on account of the bluish-black tint of their skin. Legend has it that the 5 chief families of the A. are descended from a mare known as Kehalet Ajuz (the mare of the old woman); but the Bedouins recognise 5 Kohlani strains, the first and most numerous strain being the Kehallan, which are largely bays, with a white 'star' and 1 or 2 white feet, and are reputed the fastest though not the hardest of the 5. These are the most like the Eng. thoroughbreds, being more nearly related to them than the others. The Darley Arabian—the most famous of all E. horses ever brought to England, bought in Aleppo by Mr Darley, H.M. consul, in 1704—was a pure bred Kehallan. The Abeyan strain, a smaller if handsomer horse, does not so strongly resemble the Eng. thoroughbred. A characteristic of the A. is the peculiar way he carries his well-elevated tail—very still and without the usual sideways swing—while at the gallop his dock is carried almost vertically. The A.'s weak points are a tendency to 'ewe-neck' and excessive thickness of shoulder, the latter being one of the reasons why the A. is not a fast horse judged by modern standards. A height of 14.2 hands is the proper height for the A., whence we may infer that the size and strength of our modern Eng. horses are not solely due to A. blood. Pure-bred A.s are of most colours, but the bay and grey predominate; there are also many chestnuts, and sometimes browns and blacks. A feature of the A. is his endurance; but, as regards speed, the A., owing to careful crossing, is quite out-matched by modern Eng. racehorses. Nor, again, are A.s much used as jumpers, steeplechasers, or hunters. The A., however, makes an excellent polo pony and (for what little this is worth nowadays) light cavalry horse. The Anglo-A., a first cross of thoroughbred A.s, or

descended wholly through ancestors so bred, is, despite its name, a Fr. speciality, and many international show-jumping trophies have been won by Fr. teams mounted on Anglo-A.s. The best-known use of A.s in horse-breeding to-day is in the upgrading of pony stock by the use of A. stallions on selected mares of Brit. native breeds, e.g. Welsh, Connemara, New Forest, Highland. In the Nejd itself the A. is threatened with extinction owing to motorisation, oil royalties, and the fact that Islamic law condemns horse-meat as food. *Consult* W. Ridgeway, *The Origin and Influence of the Thoroughbred Horse*, 1905; Prof. J. C. Ewart, *The Multiple Origin of Horses and Ponies*, 1908; A. J. R. Lamb, *The Story of the Horse*, 1938; Lady Wentworth, *The Authentic Arabian Horse*, 1941, and *The Swift Runner*, 1957.

Arab League, most recent expression of the Pan-Arabic movement (q.v.), was founded at Cairo in Mar. 1945 at a conference of Arab states, with the encouragement of the Brit. Gov. The objects of the league as stated in the covenant are to protect the independence and integrity of the member-states and to encourage economic and cultural co-operation. To the latter end a cultural treaty was approved in Nov. 1946. The original parties to the covenant were Egypt, Iraq, Lebanon, Saudi Arabia, Syria, Jordan, Yemen, and representatives of the Palestine Arabs. Libya acceded in 1953 and the Sudan in 1955. Each member-state is represented on the council, which meets in Cairo, and the secretariat is also situated in Cairo.

The main concern of the A. L. has been the Palestine problem and it undertook the presentation of the Arab case between 1946 and 1948 at London and in the U.N. All members went to the aid of the Palestine Arabs in May 1948, but only Egypt, Syria, and Jordan (Transjordan) provided effective forces. Subsequently they have enforced an economic and political boycott of Israel.

This appearance of Arab unity cannot disguise the serious divergencies of the interests and policies of the member-states, which were apparent even during the Palestine war. Among these differences may be singled out the Egyptian attempt at gaining hegemony over the Arab world, the dynastic enmity between Saudi Arabia on the one hand and Iraq and Jordan on the other, and the varying attitudes adopted by the Arab states towards Great Britain, the U.S.A., and the U.S.S.R. In 1955 Iraq joined the Baghdad Pact. This, together with the Syro-Egyptian alliance of the same year seems to mark the end of the A. L. as an effective force. Subsequent events have done little to alter this situation, and when Israel attacked Egypt in Oct. 1956 there was no military response from the other members of the league. *See* C. Hourani, 'The Arab League in Perspective' in *Middle East Journal*, 1947.

Arabah (arid, desert region), the geographical name of that great depression of the land in which are found the

sea of Galilee, the Jordan, and the Dead Sea (Joshua xi, xii). In the A.V. of the Bible the word is trans., being generally rendered by plain, but also by wilderness or desert. The hollow known to-day as El-'Arabah stretches southwards from the line of cliffs (the Ghôr) which crosses the Jordan Valley from NW. to SE. In its S. reaches it forms 'the wilderness of Zin' (Num. xxxiv), and its undulating surface is formed of loose gravel, stones, sand, and stretches of mud. It is torn by watercourses from either side, converging on Wadij et Jaib. It is bounded on the W. by the limestone uplands of Et-Tib and the wilderness of Paran, and on the E. by the fantastically shaped and naked crags of Edom (q.v.).

Arabesque, carved or painted panel in the Rom., Hellenistic, or Renaissance style, introducing human, animal, grotesque, symbolical, or other elements in conjunction with delicate conventional foliage. The term A., though used since the 17th cent., is quite incorrect as a description, because all representations of human, animal, or other natural forms were forbidden in Arab art. There are many examples of A.s in Rome and Pompeii.

Arabi Pasha (1840-1911), leader of the insurrectionary party in Egypt, 1882, b. of fellah parents in Lower Egypt; began life as a labourer, and served in the Egyptian Army as a private soldier for 12 years. He organised a national party in opposition to the Anglo-Fr. control, obtained the deposition of the ministry, 1881, and became minister of war in the new Cabinet, 1882. He set up as an autocrat, withdrawing the budgets from the Eng. and Fr. controllers. This act resulted in war with England, whose fleet bombarded Alexandria, 11-12 July. On 13 Sept. 1882 A. P. was defeated at Tel-el-Kebir, taken prisoner at Cairo, and expelled to Ceylon. The result of his revolt was the estab. of Brit. supervision in Egypt. Pardoned by the Brit. Gov. in 1900, he returned in 1901.

Arabia (Arabic *Jazirat al-Arab*, the 'peninsula of the Arabs'; Persian and Turkish *Arabistan*), peninsula forming the extreme SW. of Asia; it is bounded on two and a half sides by the sea but on the N. and NE. it passes imperceptibly into Syria (q.v.) and Iraq (q.v.). It lies between 12° 45' and 34° 50' N. and 30° 30' and 60° E. The area is about 1,200,000 sq. m., nearly half of it desert; the length from N. to S. is about 1500 m. and the greatest width about 1250 m. Behind a narrow coastal plain ranges of mts run along the W. and S. sides of the country, and the land slopes down from these to the Persian Gulf and the Euphrates in a plain broken by a few hills. No one description applies to the whole land. In the SW. the mts reach 8000 ft and cause plentiful rainfall during the summer, though snow never falls; along the S. rain falls during the summer on the hills and in places the vegetation is semitropical. In Oman, where the mts reach 9000 ft, water is fairly plentiful and agriculture prospers in parts. In the N.,

where the hills are not so high, rain seldom falls and water is only to be found under the old drainage channels where rivs. once ran. A sudden storm may cause a flood. Where water is near the surface oases occur. An exception is the Shammar hills, the highest point of which is over 5500 ft. This is high enough to produce precipitation and even snow; and, as the ground water is near the surface, agriculture is easy, so there are as many husbandmen among the inhabs. as nomads. In places sand dunes cover vast areas, but the sand absorbs what moisture there is and in the spring produces grazing for the herds. The animals do not need to be watered and the humans drink nothing but the milk. Most of the N. Arabs are nomads, each tribe having its own area for its seasonal wandering, it may be from the centre of the peninsula in winter to the N. of Syria in summer. For details see ADEN; ASIR; BAHREIN; HADRAMAUT; HASA; HEDJAZ; JEBEL SHAMMAR; KOWEIT; MECCA; MEDINA; NEJD; OMAN; QASIM; QATAR; YEMEN.

Classical authors divided A. into A. Felix, A. Petraea, and A. Deserta, a political div. based on conditions in the 1st cent. AD; the first was independent, the second subject to Rome, and the third to Persia. The Arabs divided the people into two branches, a N. and a S., both being the offspring of Abraham, a fantasy derived from the O.T. By the time of Mohammed many S. tribes had moved from their original homes and lived among the northerners. To-day the pop. of S. A. is very mixed and many of them are quite unlike the N. Arabs; it is claimed that the core of the southerners belongs to the Mediterranean race which stretches from Spain to India. In the N. are tribes which are nomad but are not regarded as equals by the others, who will not intermarry with them. The lowest in the social scale are the Solubba, who are expert hunters; they are also smiths (they have been called kettle-menders) and ride donkeys, a thing which no Arab would do. The language of most of the land is now Arabic, one of the Semitic group. Although the latest member to become known to hist. it has preserved more primitive features than any other. The language spoken to-day has changed much from the standard classical one so that a man from Nejd would have the greatest difficulty in understanding one from the Aden protectorate. Formerly another tongue in sev. dialects was spoken in all S. A., and some dialects of the S. coast may be derived from it.

Fauna. In the N. the usual desert animals are found, gazelles of various kinds, foxes, jackals, and perhaps the ostrich and wild ass. (Hunting from a motor-car rapidly destroys all game.) In or near mts ibex, wolves, hyenas, wild-cats, and badgers exist. Eagles, vultures, ravens, kites, and hawks are found. In places snakes are common, and A. is now important to the world as a breeding ground for locusts.

History. Assyrian inscriptions mention Arabs. The last King of Babylon lived for

some years in Teima, N. of Medina. Augustus sent an army to conquer Yemen (to control the Red Sea trade), but it failed. A Nabataean state centred on Petra till it became a prov. of the Rom. Empire, and Zenobia at Palmyra tried to oppose Rome and was crushed. A tombstone from Hauran dated AD 328 bears the name of one who called himself 'king of all the Arabs.' Then buffer states came into being on the borders of Syria and Iraq, in alliance respectively with Byzantium and Persia; the Syrian princeling was given the title of phylarch. Inscriptions show that in the S. highly civilised states existed from about 1200 BC; in Yemen the Minaeans, Sabaeans, and later Himyarites ruled. In the 4th cent. AD the Abyssinians conquered part of the country but were driven out again to return in 525, only to be expelled once more. In 575 the Persians captured the land, but the natives rebelled and estab. their own gov. which was soon overthrown by the Muslims. For two and a half centuries all Arabia was subject to the caliphs; but in 897 a Zaidi sect estab. a state in Yemen which, with many vicissitudes, has lasted to the present day. Hadramaut has always led an existence apart; little is known of medieval hist., and in modern times the quarrels of princelings have no interest for others. In Oman other sectaries ruled; at one time they ruled both Oman and Zanzibar, but in 1832 the sultan went to Zanzibar and in 1856 the two ters. were divided. Nearly all that is known about the early hist. of the N. comes from outside A., as Arab tradition does not go farther back than a few generations before Mohammed. Many tribes occupied the land; a strong leader might collect a confederation which lasted two or three generations, but his doings lived only in story or poetry and no connected hist. is possible till the advent of Islam.

In 899 the Karmathians founded a state in al-Hasa and the bedouin of the centre returned to the bad ways of the 'Time of Ignorance,' fighting each other and raiding caravans. A series of orthodox sultanates divided Yemen with the Zaidi sect. Oman paid no attention to the caliph and the Hedjaz was practically independent under the sheerefs of Mecca unless Egypt interfered. When the Ottoman Turks conquered Egypt the Hedjaz submitted to them in 1517; the Turks appointed a Turkish governor beside the sheeref and exercised a loose suzerainty over the N. of A. In 1546 they got a footing in Yemen but could not destroy the Zaidi state, though in 1871 they captured Sanaa and estab. themselves more firmly. From 1792 onwards Turks and Wahhabis strove to get possession of al-Hasa, opposite Bahrein is., till in 1871 the Turks became the masters there. So in 1900 the Turks held the flanks of the peninsula and in addition had a faithful ally in Rashid of Hail, Jebel Shammar.

In 1747 Mohammed ibn Abd al-wahhab of the family of Sa'ud estab. that family's authority over Nejd. The cry

of every reformer is 'Back to the Koran' and the common name for heresy is 'innovation.' Ibn Abd al-wahhab was no exception; anything remotely resembling the worship of saints was condemned, and coffee and tobacco were forbidden. The Sa'ud family grew so strong and the Turks so helpless that Mehemet Ali, the Viceroy of Egypt, interfered and sent an army against them. After some reverses his son Ibrahim defeated the Wahhabis completely; but after his departure their power was restored in 1818, and by 1833 it was as strong as ever. The rest of the century was filled with the strife between the family of Sa'ud in Riyadh and that of Rashid in Hail. In 1891 the Wahhabi power was broken and the ruling family driven in exile. In 1904 Abdullah ibn Sa'ud recaptured Riyadh, in 1913 he took al-Hasa from the Turks, and in 1923 he put an end to the dynasty of Rashid.

There was another factor in Arab politics. By virtue of descent from Mohammed Husein, the shereef of Mecca claimed a high place in Islam, and he and his sons through residence in Stamboul knew something of world politics. In 1916 the shereef with Brit. help rebelled against the Turks and seized Mecca and Jedda, though he could not take Medina. He kept up a series of attacks on the pilgrim railway, again with Brit. help, and protected the flank of Allenby's advance on Damascus. The shereef proclaimed himself King of the Hedjaz, and in 1924 caliph when the Turks dethroned the last Ottoman sultan. This last claim annoyed Ibn Sa'ud, whose policy could not be reconciled with that of the shereef. Britain played a sorry part here, for London favoured the shereef while the gov. of India backed Ibn Sa'ud who proved the better statesman and soldier. In 1919 the Wahhabis defeated the shereef's army; and in 1924 they conquered the Hedjaz, and first the shereef and then his son abdicated. Ibn Sa'ud was now sultan of Nejd and King of the Hedjaz, and in 1927 he was hailed as King of Nejd and the combined kingdom was soon after called Sa'udi A.

He had instituted the Brethren (Ikhwan, not to be confused with the Muslim Brotherhood in Egypt), bedouin whom he settled on the land and made enthusiasts for the Wahhabi teaching. We may assume that he thought first of religion, but he created in them a body of determined fighters. Later he found it hard to control them, and their raids on Iraq and Jordan, pillaging and killing, caused much trouble. Finally one of their chief leaders, Feisal al-Duwish, rebelled, and Ibn Sa'ud had to use his army against the spirit which he had aroused.

The sacred law of Islam is the law of the country, though neighbouring Muslim countries, Egypt, Iraq, and Turkey, have introduced civil, commercial, and criminal codes; the sacred law also governs questions of personal status.

The Turks evacuated Yemen in 1918, so the Zaldi imam became the sole ruler. He quarrelled with Ibn Sa'ud, was defeated and had to surrender to him Asir

and Nejran, but was allowed to remain independent. In spite of a treaty with Britain there has been a long series of 'incidents' along the border of the Aden protectorate. The old imam was murdered in 1948 but after a short interlude a son succeeded him.

Ibn Sa'ud organised his kingdom in two parts, each under one of his sons as viceroy, though Asir had a separate administration. There were three ministers, for foreign affairs, defence, and finance, and under this last were directorates of health, education, public works, and combined posts, telegraphs, and wireless. In Riyadh and Mecca were councils of notables, and also in other places. In 1952 the Sa'udi A. Monetary Agency, a modified form of state bank, was set up in an attempt to keep the country solvent, because the extravagant demands of members of the royal family outstripped the revenue. Ibn Sa'ud d. in 1953 and the son whom he had nominated succeeded without any opposition. Any lessons which Arab hist. might teach are vitiated by the new factor, oil, and the £50 millions it brings into the land every year. There are many questions but few answers. Are the bedouin willing to become labourers? Has the tribal society broken down? Has the individualism of the tribes been overcome? Should there be strife, is the present king the man to crush it?

A railway from Damman near Bahrein to Riyadh was opened in 1951, a road runs from Jedda to Mecca and Riyadh, and another from Mecca to Medina has been begun; there is air traffic between Jedda, Taif, Riyadh, Hofuf, and Dahrhan. In 1952 a gold coin, equal to a sovereign and divided into 40 riyal, was introduced. Gold is mined profitably at Mahd between Medina and Mecca.

Exploration. Ptolemy's geography shows that the Romans were well acquainted with the coasts of A. and with the interior of the N., but this knowledge was lost. The first known Englishman to visit the holy cities of A. was Joseph Pitts, c. 1690, and a renegade Scot was Governor of Medina early in the 19th cent.; but these were hardly explorers. In 1761 a Danish expedition set out on a long tour of discovery, and the report by Carsten Niebuhr, the only survivor, contains a full and accurate description of Yemen. Domingo Radia y Leblich visited Mecca but could not reach Medina. J. L. Burckhardt travelled widely in the Hedjaz but was more interested in life than in geography. G. A. Wallin explored Nejd, while Burton travelled with the pilgrims from Syria to Mecca and later explored Midian. Doughty travelled with the pilgrims as far as Medain Saleh and then wandered in the desert as far E. as Hail and as far S. as Taif. The Blunts followed the road of the Persian pilgrims to Bagdad. H. St B. Philby has travelled over most of A. and has recorded his journeys. In the S. Wellsted visited Oman in 1835, Miles crossed the mts of Oman in 1876, Haines explored the S. coast and the Hadramaut 1834-6, and von

Wrede went from the coast to the edge of the desert in 1843. In 1935 the Ingrams travelled the length of Hadramaut to the sea. One cannot name all the adventurous spirits, some of whom lost their lives in A. See also ISLAM.

Bibliography. HISTORY: R. A. Nicholson, *Literary History of the Arabs*, 1907 and 1930; C. Huart, *Histoire des Arabes*, 1912-13; De L. O'Leary, *Arabia before Muhammad*, 1927; G. Antonius, *The Arab Awakening*, 1938; P. Hitti, *History of the Arabs*, 1940, etc. **EXPLORATION:** R. F. Burton, *Personal Narrative of*

One Nights, is the name of a very well-known collection of tales, long current in the E. They are supposed to have been derived by the Arabians from India through the medium of Persia. The tales themselves are connected with all subjects, but the connecting link, the thread on which they were strung, is as follows: The Sultan Shahriyar, enraged by the discovery that his bride was unfaithful, made a law that in future all his wives should be executed on the morning after the marriage. This law was duly carried out, until the sultan wedded Shahrazad,



E.N.A.

ARABIA: THE HADHRAMAUT

Houses on the ramparts of the old town at Seyun.

a Pilgrimage to Al-Medina and Mecca, 1855, etc.; C. M. Doughty, *Travels in Arabia Deserta*, 1888, etc.; D. G. Hogarth, *The Penetration of Arabia*, 1904; A. Jaussen, *Coutumes des Arabes au Pays de Moab*, 1907; H. St. B. Philby, *The Heart of Arabia*, 1922, *Arabia of the Wahhabis*, 1928, *The Empty Quarter*, 1933, *Sheba's Daughters*, 1939, and *Arabian Highlands*, 1952; R. E. Cheesman, in *Unknown Arabia*, 1926; T. E. Lawrence (afterwards Shaw), *Seven Pillars of Wisdom*, 1927; A. Musil, *In the Arabian Desert*, 1930; H. E. P. Dickson, *The Arab of the Desert*, 1948.

Arabia, name of famous porcelain and earthenware art producers in Helsinki. Their contemporary designs are known all over the world.

Arabian Architecture, see MUSLIM ARCHITECTURE.

Arabian Gulf, see RED SEA.

Arabian Nights, or *The Thousand and*

the daughter of his grand vizier. This lady was a matchless *raconteuse*, and by the expedient of leaving off every night in the midst of a fresh tale of surpassing interest, she induced the sultan to defer her execution until the day after, for a thousand and one nights, when her doom was postponed *sine die*. The tales were first introduced into Europe at the beginning of the 18th cent., by means of the Fr. translation of Antoine Galland. Of some of them no MS. is known, and Galland took them down from the mouth of a Syrian friend. Lane was the first Englishman to translate them worthily, and his opinion is that in their present form they date back to about 1500.

'**Arabic**, The, White Star liner sunk without warning by Ger. submarine on 19 Aug. 1915, off co. Cork. The ship was carrying sev. Amer. citizens, some of whom perished. America protested, and the Ger. Gov. offered full satisfaction and undertook not to sink liners without

warning and without providing for the safety of the lives of non-combatants, but the undertaking was soon broken.

Arabic Numerals, see NUMERALS.

Arabil, **Arabil**, or **Arabians**, small sect of Christians which existed in the 3rd cent., chiefly in Arabia. They held that the soul would perish with the body, but that both would be restored at the Resurrection. At the council of Arabia, c. 247, Origen confuted this opinion. See Eusebius, *Historia Ecclesiastica*, vi. 37; St Augustine, *De Haeresibus liber*, c. 83; J. F. Buddeus, *De Arabicorum Haeresi*, 1713.

Arabin, **Arabic Acid**, or **Gummie Acid**, constituent of gum arabic. Gum arabic consists of the potassium and calcium salts of A. The A. may be set free by adding hydrochloric acid to the mucilage, and may be separated by dialysis, or passing through parchment paper, as the gum passes through with great difficulty. Alcohol added to the solution precipitates the acid as a white amorphous mass.

Arabis, genus of over 100 species of ann. or perennial herba, family Cruciferae, chiefly of N. hemisphere. *A. albida* and vars., white flowering Rock Cress, are popular rock garden plants.

Arabistan: 1. A general oriental name for Arabia and other dists. inhabited by Arabs. See ARABIA.

2. A prov. of Persia, now known as Khuzistan.

Arabona, see GYÖR.

Aracajá, city and port of Brazil, and cap. of Sergipe. Six m. from mouth of Cotiguba R., 175 m. NE. of Salvador. Exports sugar, timber, hides. Pop. 78,364.

Aracari, the native name of *Pteroglossus aracari*, one of the toucans. It belongs to the Rhamphastidae, is allied to the woodpeckers, and is found in tropical America.

Aracati, tn and port of Ceará, Brazil. Exports include cotton and carnaúba wax. Pop. 6700.

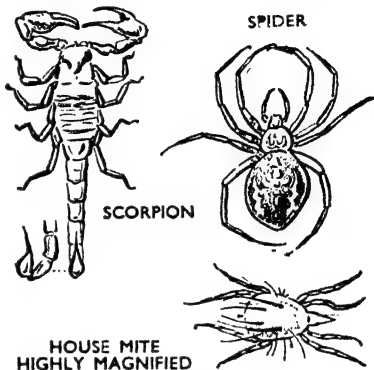
Araceae, family of over 1000 monocotyledonous, chiefly tropical, plants. The flowers are usually monoecious, the perianth is absent or has from 4 to 6 leaves, there are 1 to 8 stamens, often united into a *syndrium*, the ovary often consists of 1 carpel; the fruit is a berry, and the seeds are sometimes exalbuminous. Genera include *Acorus*, *Anthurium*, *Caladium*, *Calla*, *Dieffenbachia*, *Monstera*, *Philodendron*, *Scindapsis*, *Zantedeschia*, etc.

Arachis, family Leguminosae; genus of Brazilian annuals, of which *A. hypogaea*, earth-nut, monkey-nut, pea-nut, ground-nut, is grown in tropical countries, for its oily edible seeds. After flowering, the flower stalks bend and elongate, forcing the pods into the soil where they ripen.

Arachne, legendary daughter of Idmon of Colophon, a dyer in purple, excelled in weaving, and challenged Athena in the art. She produced a piece of cloth in which the amours of the gods were woven, and unable to find a fault in it Athena tore the work to pieces. A., in despair, hanged herself; Athena saved her life,

but the rope was changed into a cobweb and A. herself into a spider (Gk *arachnē*).

Arachnida (Gk *arachnē*, spider), class of arthropods, including spiders, scorpions, and mites, differing from insects in having no antennae, a fused head and thorax, and simple eyes varying in number from 2 to 12. They are mostly carnivorous; the scorpion has poison-glands leading to the sting. There are 9 orders: the *Scorpionidae* or scorpions;



ARACINIDS

Pedipalpi, or whip-scorpions; *Araneida*, or spiders; *Palpigradi*; *Solitugae*, or wind-scorpions; *Pseudoscorpionidae*, or book-scorpions; *Podogona*; *Phalangidae*, or harvestmen; *Acarina*, or mites. Two other orders also exist: the *Xiphosura*, or king-crabs, and the *Eurypterida*. For further information see under individual heads.

Arachnoid Membrane, thin, web-like membrane of the brain which lies between the pia mater and the dura mater. It surrounds the nerve centres, and contains no blood-vessels; it can be separated from the dura mater, to which it adheres by its parietal layer, only by dissection. See BRAIN.

Arachosia, prov. of the auct Persian Empire, lying in the basin of the Helmand R., and corresponding to the SE. part of modern Afghanistan.

Arad, tn in Rumania, cap. of the prov. of Arad; on the bank of the R. Mures. It is an important railway centre, and has a large trade in spirits, wine, corn, and tobacco. It was the scene of much fighting in the 17th cent. in the wars between the Turks and the Hungarians, and in the revolutionary war of 1849 was once captured by the Austrians. Pop. (1948) 87,300. The suburb New A. is on the opposite bank of the riv.

Aradus, see ARVAD.

Araf. It is assumed that this word is the plural of *urf* (mane of a horse), so it is explained as a high place from which both heaven and hell can be seen. It is not certain whether, in Islamic religion, those on A. are candidates for heaven or hell, or

are prophets or men of that rank. It is not a purgatory.

Arafat, hill and plain about 15 m. E. and a little S. of Mecca. The hill is granite and may be 200 ft high; it is also called Jebel-al-Rahma. On this hill occurs the most important ceremony of the pilgrimage. See HADJ.

Arafura Sea, div. of the Pacific Ocean, lying between the N. coast of Australia and the W. part of New Guinea. It merges with the Timor Sea (W.) and Torres Strait (E.), and contains the Aru Is. (q.v.).

Arago, Dominique François Jean (1786-1853), Fr. physicist and astronomer, b. Estagel and d. Paris. He was appointed secretary to the Bureau des Longitudes, and in 1806 helped Biot to measure an arc of the meridian. At the age of 23 he became a member of the Academy of Sciences, and afterwards director of the Observatory. In collaboration with Fresnel he showed that experimental evidence on diffraction confirmed the wave theory of light. In 1830 he was appointed perpetual secretary to the Academy of Sciences, Paris, and in 1848 was a member of the provisional gov. His complete works were pub. in 1854-62. He was held in great esteem and reputation throughout Europe; he opposed Louis Napoleon, and refused to take the oath of allegiance, 1852. See Audiganne. *Arago* (2nd ed.), 1869.

Aragon, Catherine of, see CATHERINE OF ARAGON.

Aragon, Louis (1897-), Fr. poet and novelist, b. Paris. At first a surrealist, he became an ardent Communist in 1930. His novels, *Le Paysan de Paris*, 1925, and *Les Cloches de Bâle*, 1934, deal with the decay of the bourgeoisie. His verse, written during the Second World War, is essentially nationalistic: *Cruc-Cruc*, 1941, *Les Yeux d'Elsa*, 1942, and *La Diane française*, 1945.

Aragon, Tullia d', see D'ARAGON.

Aragón: 1. (Eng. *Aragon* or *Arragon*) Former kingdom of Spain, in the N.E. of the peninsula, comprising the modern provs. of Huesca, Teruel, and Zaragoza (qq.v.). It was recovered from the Moors in 1131. Catalonia (q.v.) was united with it in 1137 and Valencia (q.v.) in 1238. The kings of A. secured also the Balearic Is., Naples, Sicily, and Sardinia (qq.v.). The succession to the throne of Ferdinand II (q.v.) in 1479 united A. with Castile, and was the foundation of the kingdom of Spain (see CASTILE and SPAIN, *History*). The prin. riv. of A. is the Ebro (q.v.), which receives numerous tribs. both from the mts of the S. and from the Pyrenees in the N. The central plain, except for the Ebro valley, is sterile. The highlands, however, are known for their magnificent scenery, are well forested, and are very fertile. Cereals, rice, and oil are produced, and a prin. export is merino wool. Area 17,935 sq. m.; pop. 1,102,912.

2. Sp. riv. which rises in the Pyrenees, and flows SW. through the provs. of Huesca, Zaragoza, and Navarra to join the Ebro (q.v.). Length 80 m.

Aragón Canal, see IMPERIAL CANAL.

Aragona, tn in Sicily (q.v.), 7 m. NNE. of Agrigento (q.v.). It has an old castle of the Aragonese princes, and there are sulphur mines. Pop. 17,000.

Aragonite, mineral consisting of calcium carbonate, CaCO₃. It has a sp. gr. of from 2.92 to 3.28 and a hardness of from 3½ to 4. It crystallises in rhombic prisms, and twinning on the prism planes is a frequent phenomenon. A. is found in Aragon, Hungary, Sicily, Cumberland, and in the neighbourhood of hot springs, as at Carlsbad. It is distinguished from the other variety of calcium carbonate, calcite (q.v.), by its greater sp. gr. and its different form of crystallisation.

Arago's Disk, see INDUCTION, ELECTROMAGNETIC.

Aragua, state in NW. Venezuela, area 2160 sq. m., constituted under the re-division of 1904, and lying mainly within the parallel ranges of the Venezuelan Cordillera. Products: textiles, coffee, cacao, sugar. Chief tns: Maracay (cap.) and Carlsbad. The pop. is about 190,000.

Araguaia, riv. (formerly spelt *Araguaya*) in central Brazil, which has a length of about 1100 m. and flows into the Tocantins, close to São João. It forms the W. border of the state of Goiás.

Arak, dist. and tn of Persia, SW. of Qom, and situated on the trans-Iranian railway. Has trade in carpets. It was formerly called Sultanabad. Pop. of tn 55,000.

Arakan, div. of Lower Burma, on the Bay of Bengal between Pegu and Chittagong, having an area of about 14,500 sq. m.; pop. (div.) 1,186,800. A. div. consists of 3 dists., Aleyah, Kyaukpaya, and Sandoway. The old cap. bears the same name, but is generally called Myohoung to-day; formerly a large tn, but now dwindled to little over 2000 people. The div. exports rice, timber, tobacco, and cotton. The majority of the inhab. are Buddhists. For the military operations in A. in the Second World War see BURMA, SECOND WORLD WAR, CAMPAIGNS IN.

Arakcheyev, Aleksey Andreyevich, Count (1769-1834), favourite of Emperor Alexander I of Russia. He became War Minister in 1808. A. greatly influenced internal policy in the spirit of extreme reaction. His name has become in Russia a symbol of intolerable one-man despotism.

Aral, Sea of, brackish lake in Asia, and, after the Caspian Sea, the largest inland sheet of water in this continent. It is in Soviet ter., and is about 270 m. long by 165 broad. It is shallow, and nowhere has a greater depth than 220 ft. Two great rivs. drain themselves into this lake, the Syr Daria (the Jaxartes of old) and the Amu Darya (Oxus). At one time it is thought to have formed part of the Caspian Sea. It has no outlet, but much water is drawn off by evaporation. A number of small is. are dotted about over it, mainly towards the E. shore. By references of anc't writers it is probable that its shape has altered considerably, and part of its area was once dry land.

Aralia, family Araliaceae, genus of hardy shrubs, trees, and herbaceous plants, native to N. America, Asia, and Australia. *A. elata*, the Jap. Angelica Tree, is ornamental for mild dists. in Britain; *A. spinosa*, Hercules Club, is a rare tree; *A. cachemirica*, Kashmir, *A. cordata*, Japan, and *A. nudicaulis*, N. America, are herbaceous perennials, grown for their effective foliage.

Aram, Eugene (1704-59), erudite Eng. schoolmaster who gained notoriety by the murder attributed to him. The story of the crime is the theme of Hood's poem, *Dream of Eugene Aram*, and of Lytton's romance, *Eugene Aram*, 1832; *b.* Rams-gill, Yorks. A. married early and settled as a schoolmaster or usher at King's Lynn. The murder was committed at Knaresborough in 1745, the victim being a certain Daniel Clark, a man who had swindled tradesmen and disappeared. A. hid the body in a cave on the banks of the Nidd. The crime remained undiscovered for 13 years, and it was not until 1759 that he was brought to trial at York and, after he had defended himself with great eloquence, sentenced to death. He was a scholar and philologist of some eminence and had gathered much material for a projected *Comparative Lexicon of the English, Latin, Greek, Hebrew, and Celtic Languages*. See E. R. Watson, *Eugene Aram, his Life and Trial*, 1912.

Aram (Aramea), probably the name of a people, was applied to the country N. and NE. of Palestine from the Mediterranean to the middle of Mesopotamia. In the O.T. A. occurs in sev. combinations and Damascus was the most important state. From A. is derived Aramaic, the name for a group of dialects. One became the *lingua franca* of the near E. about 600 BC; it was used for dockets on cuneiform tablets in Babylon, for correspondence by Persian officials in Egypt, and an Aramaic inscription was found in Taxila in India. The Arab Nabataeans used it in their inscriptions. It belonged to the Semitic family of languages and was very like Hebrew. The so-called square character used for printing Hebrew was borrowed from Aramaic, replacing the original Phoenician script. Hebrew died out as a spoken tongue and some form of Aramaic was spoken in Palestine at the time of Christ, as quotations in the Gospels show. The chief literary languages are the Targums (used in translations of the O.T. for use in the synagogue), the Babylonian Talmud, and the form used by Christians which split into two branches, W. and E. Syriac. Modern derivatives of Syriac are still spoken in some vils. near Damascus and in Mt Sinjar in W. Iraq. See HEBREW and SEMITIC LANGUAGES.

Aramaean, Aramaic, see ARAM.

Aran Islands, group of is. situated in Galway Bay, 30 m. from Galway, on the W. coast of Ireland. They form a natural breakwater. In order, from the N., their names are Inishmore (7635 ac.), Inishmaan (2252 ac.), and Inisher (1400 ac.). Kilronan is the cap. of the is. They contain architectural remains of early origin, among which are the ruins of the

Abbey of Killenda. For a time Aran was a famous seat of religion and learning. The chief industries are fishing and agriculture. The islanders are immortalised in J. M. Synge's *Riders to the Sea* and *The Aran Islands*, and were portrayed in the famous film *Man of Aran*. Total pop. 2600. Another is. of the same name is situated off the co. of Donegal.

Arando, Pedro Pablo Abarca de Bolea, Count (1718-98), Sp. politician and general, b. Siétamo in Aragon. In 1740 he entered the army and took part in the war of the Austrian succession. He copied Frederick the Great in his methods of military discipline. In 1766 he was called on by Charles III to restore order in Madrid, and, having done so, became most important minister in Spain. He d. at Epila after his fall (1792), due largely to his attitude of sympathy with the Fr. Revolution.

Aranjuez, Sp. tn in the prov. of Madrid, on the Tagus. It has a palace with beautiful gardens, which was, until 1890, the summer residence of the Sp. court. The tn has many fine mansions, is a tourist resort and mkt tn, and is noted for its strawberries and asparagus. Pop. 25,000.

Arany, János (1817-82), Hungarian poet, b. of poor Calvinist parents at Nagyszalonta, where he became teacher and later notary. In 1840 he married Juliana Ercesey. His greatest work, *Toldi*, 1847; *Toldi's Evening*, 1854; and *Toldi's Love*, 1879, an epic trilogy, relates the exploits of the great Hungarian hero Miklós Toldi. Other epics are *The Gipsies of Nagyida*, 1852, a savage satire on the revolution, and *The Death of King Buda*, 1864. A.'s ballads (e.g. *The Bards of Wales*) show his absolute mastery of language and metre. He also trans. Shakespeare and Aristophanes. He d. in Budapest. In English the only extensive trans. so far is *The Death of King Buda*, by Watson Kirkconnell, 1936.

Arapahois, Algonquian tribe of N. Amer. Indians, and one of the most famous raiding tribes of the plains. To-day there are about 4000 A., mainly in Wyoming. See Krober, *The Arapahoe*, 1904, and F. Eggan, *Social Anthropology of North American Tribes*, 1951.

Arapaima (native Brazilian name), genus of fishes of the family of Osteoglossidae, related to the salmon and herring. *A. gigas* is the largest freshwater fish in the world, attaining 15 ft in length. It is captured by spearing in S. America for exportation.

Arapiles, Los, Sp. vil. near Salamanca (q.v.), the site of the battle of Salamanca in 1812 during the Peninsular war (q.v.).

Arara, common S. Amer. name for the macaw (q.v.).

Ararat, city (since 1950) of Victoria, Australia. Its pop. is about 5000. It is situated towards the W. extremity of the Great Dividing Range. It is the centre of the trade in grain and wool of the NW.

Ararat, highest point of Armenia. It rises to a level of 17,000 ft. It is situated in the plain of Aras. The mt mass of A., rising from the Armenian plateau, con-

sists of 2 portions, the Great and Little Ararat. Tradition makes it the resting-place of Noah's ark. The mt. is of volcanic composition, though no recent outbreak has occurred. The name also applies to the country of Urardhas, where the ark rested after the flood. The name is unknown to Armenians of the present day.

Aras, the **Araxes** of Xenophon, riv. rising S. of Erzerum and flowing through the Erzerum prov. into the Persian plateau. It has a length of 600 m. Its trib. is the Zanga. From 180 BC to AD 50 Aratanata was the cap. of Armenia and stood on an is. in the A.

Arason, Jón (1484-1550), bishop of the N. diocese in Iceland; introduced printing into that country (c. 1530), and vigorously opposed the Lutheran reformation which the Dan. kings were forcing upon the people of Iceland. For that opposition the bishop, together with two of his sons, was beheaded by Dan. officials without trial, after which all resistance broke down and the Lutherans triumphed. A. is one of the most heroic and imposing figures in Icelandic hist., and tyrannic though he could be he had many lovable qualities. He was the foremost poet of his time, and other poets, including Matthias Jochumsson (q.v.) and the Norwegian poet Kristoffer Janson, have found in him a proper subject for the exercise of their genius. Biographies by Páll E. Olason and Guðbrandur Jónsson.

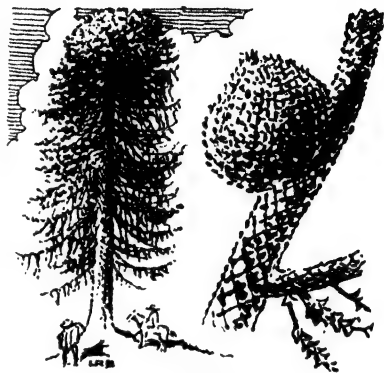
Aratus (315-240 BC), Gk poet contemporary with Theocritus. While residing at the court of Antigonus Gonatas he wrote his celebrated astronomical poem *Phaenomena* (ed. by E. Maass, 1893), which was very popular in ant. times and was trans. into Latin by Cicero. He d. in Macedonia. St Paul's quotation in his speech to the Athenians (Acts xvii. 28) is from the *Phaenomena*.

Aratus (271-213 BC), Gk statesman, b. Sicyon. His father was put to death by the tyrant Abantidas in 266, and A. was brought up at Argos. At the age of 20 he freed Sicyon and brought that city into the Achaean League, whose general he became in 245. A. was eventually poisoned by order of Philip III of Macedon.

Araucanians, Indian natives of Arauco in Chile. The most important divs. are the Mapuche and Huilliche. Formerly gov. rested in 4 *toquis* or princes, the chief of whom was the Great Tarqui. Rank was derived from martial prowess, wealth, generosity, and eloquence in speech. They number about 200,000. The A. vigorously resisted the Sp. occupation, and made desperate but futile opposition to it. They were formerly cannibals, eating war captives. They have a belief in a Supreme Being, who is ambisexual, addressed as either 'Father' or 'Mother.' See J. M. Cooper, 'The Araucanians,' in J. H. Steward's *Handbook of South American Indians*, vol. ii, 1946.

Araucaria, genus of gigantic pines (Pinaceae) found scattered over the S. hemisphere. Its leaves are stiff and broad; the scales of the cones bear a leafy

appendage, and the anthers are many-celled. *A. excelsa*, the Norfolk Is. pine, abounds in turpentine, and provides a heavy timber; *A. bidwilli*, the bunya-bunya pine, grows in Australia; *A. araucana*, Chile pine, or Monkey Puzzle, yields much resin. *A. angustifolia*, Parana pine, or Candilabra tree, of Brazil, and *A. cunninghamii*, Moreton Bay pine, or Hoop pine, of Australia, are valued timber trees.



ARAU-CARIA

Arauco, maritime prov. of N. Chile. Its area is 2222 sq. m. and its pop. 72,282. Its nature is agric. but in modern times important coal-mines have been developed. Cap. Lebu.

Araunah (in Chron. Ornan). Jebusite owner of a threshing floor on Mt Moriah, which David purchased as the site of an altar to halt a plague (2 Sam. xxiv; 1 Chron. xxi). This afterwards became the site of Solomon's Temple.

Arauré, tn of Portuguese state, Venezuela. An agric. and cotton-growing centre. Pop. about 2000.

Arawak, Amer. Indian tribe formerly inhabiting the Caribbean is. and coastlines, only a few scattered remnants now being left. Their chief was treated with great ceremony, being carried in a golden litter; at death he was desiccated and kept as an idol. The A.s were treated with great cruelty by the Spanish, who killed them in war or forced them to labour in the mines. See J. H. Steward, *Handbook of South American Indians*, vol. iv, 1948.

Arazá, spa in Minas-Geraes, Brazil, on the Rio das Velhas. Pop. 10,000.

Araxes, name of sev. rivs.: (1) In Armenia, the modern Aras (q.v.). (2) In Persia, which flowed into a salt lake not far below Persepolis, which it stood on its banks. (3) The A. or Chaboras in Mesopotamia, which flowed into the Euphrates. (4) The A. mentioned by Herodotus (i. 20), which cannot be certainly identified.

Arba, see RAB.

Arbaces, general of Sardanapallus (q.v.). He founded the Median Empire

about 830 BC. This is according to the very doubtful hist. by Ctesias. However, there are inscriptions of Sargon II of Assyria, where mention is made of one Arbaku, a Median chief in 713 BC.

Arbalest, or Arblast, see CROSS-BOW.

Arbela, anct. tn of Adiabene, mod. Erbil, 48 m. SE. of Mosul. Assyrian Arbailu was a religious centre (goddess Ishtar) controlling the country between the Greater and Lesser Zab rvs., on behalf of the capital cities of Nineveh, Assur, and Calah. The citadel has been continuously inhabited from prehistoric to modern times. See also GAUGAMELA.

Arber, Edward (1836-1921), scholar, b. London, son of an architect. He worked as a clerk in the Admiralty, but studied English and became Prof. of English at the Mason College, Birmingham. He ed. and pub. sev. valuable series of reprints, including *Arber's English Reprints*, 1868-1871, *English Scholar's Library*, 1878-1884, and *An English Garner*, 1877-96, as well as sev. important bibliographical works.

Arbitrage, commercial term applied to the process of equalising prices in different business centres by buying in the cheaper market and selling out in the dearer. It is mainly carried on between London, other European caps., and New York, and deals for the most part with stocks and shares, foreign exchange, and bullion. The profits of A. are small except in stocks, in which case the operation is attended with considerable risk.

Arbitration, in civil law (Lat. *arbitrari*, to judge), term which has come to us from Rom. law, and which is applied to a judgment given by a selected person or persons in some disputed affair. In Rom. law we find in existence 2 forms of A., one compulsory and the other purely voluntary. As is the case in Eng. law, the arbitrators must come to a decision on all points submitted to them. A. as a method of judgment may be said to apply roughly to 3 different sets of circumstances: in civil law, in international law, and in the settlement of labour disputes.

The mode of proceeding to A. is by 'a submission' or 'reference' to 'arbitrators' or 'referees', who then proceed with due consideration of 'equity' to give their 'award.' This manner of the settlements of disputes has been supported and encouraged in England for a considerable time, and many Acts of the last cent. provided for the use of A. in cases of dispute which would otherwise have come under the jurisdiction of the civil courts. Almost all civil cases can be submitted to A., and seldom when an award has been given by A. has it been set aside on a technical point. Breach of contract, breach of promise cases, property disputes, slander actions, trespass actions can all be submitted to A. In 1889 the A. laws of England, so far as procedure is concerned, can be said to have been practically codified. A matter which is clearly illegal and contrary to the public weal cannot be referred

to A., since it is obvious that from motives of public policy and safety such matters must be punished for the public good. Anyone who is capable of making a contract may be said to be capable of making a reference to A., and persons incapable of making a contract cannot make reference to A. It has also been held that reference to A. made by a lawyer for his client must stand good. In the choice of an arbitrator the parties at difference are absolutely free, and provided that the person chosen is not incapable of making sane judgments, the choice will be upheld by law. It is customary to choose as an arbitrator a person capable by training of examining evidence, or a person who is familiar with the subject under A., e.g. in naval matters a seafaring arbitrator. In most cases of A. a lawyer is chosen. All these rules apply to voluntary A. A court or judge may put any point arising in any case to compulsory A., when the award of the arbitrators may be enforced as the judgment of the court.

Arbitration Act of 1930. This Act is a corollary to the Arbitration Act of 1889, in that it carries further the constantly increasing desire of Parliament to aid and encourage private A. Its enactment resulted from the requirements of international trade and it was passed in consequence of resolutions discussed under the auspices of the League of Nations. In 1923 the League Assembly promulgated a Protocol on Arbitration (Clauses, recognising submissions to A., and effect was given to that protocol by the Brit. Gov. in the Arbitration (Clauses (Protocol)) Act, 1924. The next step in the raising of the status of private A.s was the Geneva Convention on the Execution of Foreign Arbitral Awards which the Brit. Gov. accepted in 1927. The Act of 1930 was passed to give effect to that convention. The vital provision of the Act is the second section, which declares that a foreign award may be enforced in England either by an ordinary action at law or as a judgment or order under the Act of 1889, thus placing foreign awards on as sure a foundation as Eng. awards, so far as recognition and enforcement by Eng. courts are concerned. But the aid of our courts can be invoked only if one at least of the parties concerned is a subject of a power which has made reciprocal provisions to enforce foreign awards, as declared by Order in Council, or if the award was given in a ter., e.g. a colony or protectorate, which has received similar recognition by Order in Council. The statute law of A. has now been consolidated in the Arbitration Act, 1950.

Arbitration, Industrial, or A. in labour disputes, usually takes place between representatives of the employers and of the employed, although frequently an independent arbitrator is appointed. A. was purely voluntary until 1896, when legislation placed it on a legal footing. Previous to this, however, A. and A. boards had been estab. in almost every trade in the country.

The Conciliation Act of 1896 repealed all previous legislation, and, supported by the fact that a coal dispute had been settled by Lord Rosebury in 1893 and a cab drivers' dispute by the Home Secretary in 1895, stated that in cases of dispute between employer and employed meetings might be held with an independent chairman, or a chairman appointed, on application, by the Board of Trade. The formation of conciliation boards by the president of the Board of Trade (Lloyd George) temporarily averted the railway strike which was to break out in 1910. In 1912 compulsory conciliation boards were set up by the Conciliation Bill which helped to end the coal strike of that year. These boards were to have independent chairmen elected by a given date, failing which they were to be appointed by the gov., or they could, on application, be appointed straight away by the Board of Trade. These conciliation boards were to fix the wages which had been in dispute during the coal strike. In the U.S.A. about 30 states have made constitutional or statutory provision for mediation in trade disputes. Federal legislation may not touch the question of A. and conciliation save as regards disputes affecting inter-state commerce.

The Industrial Courts Act, 1919. The Conciliation Act of 1896, combined with the Industrial Courts Act, 1919, represents the characteristic Brit. form of the system of settlement of industrial disputes by conciliation and A., with its emphasis on voluntary or optional resort to investigation, conciliation, and A. by competent tribunals. Voluntary recourse to these methods, with or without encouragement or assistance from the gov., has now been a long-established practice in all the well-organised Brit. industries; while trade boards supply the need in the less well-organised and unorganised industries. In some Brit. dominions, however, the principle of compulsory A. has been adopted, and the legislation of most of the Australian states has been modelled upon it. Italy, too, under the Fascist gov. of Mussolini, adopted a compulsory A. law which absolutely forbade stoppages of work. The tendency towards compulsion is not otherwise very pronounced. In the First World War compulsory A. was adopted by the Munitions of War Acts, 1915-17, which provided for settlement of wage disputes by a committee of production, a court of A., or a single arbitrator. This system was continued for a time after the war by the Interim Wages Act, but in 1919 compulsion in the United Kingdom was abolished by the Industrial Courts Act, which estab. a standing industrial court of independent persons and representatives of employers and work-people to deal with such disputes as might be referred to it, with the consent of both parties, or to investigate the circumstances surrounding a dispute if the Minister of Labour, with or without the consent of the parties, deemed inquiry to be desirable. In its original form this measure contemplated

compulsory A., and went so far as to make trade union funds liable for strikes against the decisions of the arbitrators, but in its accepted form neither the awards of the court nor the findings of an inquiry are made binding upon the parties. Thus the tradition of voluntary resort to A. is perpetuated, the only significant departure being the extension of the power to order an inquiry into the circumstances of a dispute at the minister's discretion. The Act lies on the border line between A. and conciliation in that it partakes of the nature of both. But the statutory power given to the Minister of Labour with respect to investigation is not adequate, in that it is left entirely to his discretion to order an inquiry, and the court has no power to compel production of documents and witnesses. Elsewhere important changes in the machinery of conciliation and A. have been introduced by all the larger countries of the world since 1920.

In some countries the arbitral body itself exercises the initiative, e.g. in Canada, under the Industrial Conditions Act, 1919, of Manitoba, a joint council of industry was set up of 5 persons, 2 each representing employers and employees, with an impartial chairman, with the assistance of technical advisers appointed by the lieutenant-governor. This body can take the initiative in investigation of conditions affecting wages, including cases of alleged unfair profits through low wages, cost-of-living inquiries, and so forth.

While experience on the whole seems to strengthen the traditional Brit. method of voluntary conciliation and A., it also tends to confirm the view that in some authority should be vested the power ultimately to compel inquiry, and that the investigating tribunal should be such as to guarantee the permanence of the settlement. These inferences are suggested by the settlements of trade disputes in Australia. Underlying the whole problem is that of ensuring that the spokesmen of both sides properly represent their members. This is largely true on the employers' side, but often much less true on the workers' side; and this in turn raises the further question of the working of the democratic process in the trade unions. In the period after the Second World War full employment greatly increased the bargaining power of the unions, and a series of strikes, some seemingly for frivolous reasons, provoked discussion of the possibility that A. and/or conciliation, at least in 'public service' industries such as transport, fuel, and power, should be compulsory. See TRADES DISPUTES ACT and CONCILIATION IN INDUSTRY.

Arbitration, International, act by which 2 nations agree to submit their differences to 1 or more persons, and to agree to their award after both the parties at difference have had an opportunity of being heard. If the arbitrator is an emperor, a king, or president of a republic, he is not expected to act in person, but to delegate his authority to a chosen board of arbitrators. Further,

the award of a board of arbitrators is not enforceable, as is the award of an enforced A. of civil law, but rests entirely upon the faith and honour of the parties submitting their case to A. It is usual also to appoint an odd number of arbitrators, and to abide by the decision of the majority in case a unanimous agreement is not arrived at.

I. A. has to deal not only with questions of law, but also with questions of fact. Usually, however, when a point of law has to be decided, the case is referred to a court of A., which gives an 'award' as in the case of civil law. But frequently cases of frontier questions and pecuniary liability have to be decided, and in that case a 'mixed commission' usually hears the case, i.e. a commission composed of representatives from both or all sides. In the 2 decades immediately preceding the First World War I. A. was used frequently by many nations. Great Britain figured in the greatest number of cases, being followed by the U.S.A. and France. The subjects in dispute may be roughly described as differences over the ownership of land or of fishing rights, and pecuniary losses caused by the wrong action of another state. Among the most important cases submitted to A. in the earlier years were the Alabama case, the Bering Sea controversy, and the long-drawn-out case of the fishing rights of the French off the coast of Newfoundland, which was settled in 1904, and which had dragged its slow length along since 1711. A permanent court was estab. at The Hague in 1900 to which many important cases have been referred. The Hague Court of A. was the realisation of an old ideal dating back to the 18th cent., and was the immediate outcome of a peace conference called by the Tsar of Russia in 1899. Sixteen of the powers agreed to the appointment of a court which should be open for the settlement of all disputes amongst nations. The court was to be composed of men learned in international law and appointed by the signatory powers. The aim of the court was obviously the furtherance of the peace movement by the submission to this permanent court of all disputes from which war might arise. Probably its most important decision was given in the case of Great Britain, Germany, and Italy versus Venezuela. On that occasion it may have prevented war, and it certainly allayed the spirit of hostility which had arisen from the Venezuelan question.

Arbitration between Great Britain and the U.S.A. It is to be observed that long before there was any world court of justice or a Hague court, Great Britain and the U.S.A. were distinguished among all the nations for their readiness to submit differences to A. rather than resort to arms. One of the most famous cases between the 2 nations was that known as the Alabama case (see ALABAMA, THE). The most serious difference between America and Great Britain in modern times occurred during the second administration of President Cleveland. In 1895 there was a dispute between

Venezuela and Great Britain over the boundary between Venezuela and Brit. Guiana. Secretary of State Richard Olney of the U.S.A. intervened in a dispatch to the Brit. Gov. which brought relations between the 2 countries almost to the breaking point. The crisis was allayed by the judicious policy of Lord Salisbury, then Brit. Prime Minister, and the matter was submitted to A. and settled in 1899. Other prominent cases in which the U.S.A. and Great Britain were involved, and which were settled by A., were the boundary dispute between Alaska and Canada in 1903, and the N. Atlantic coast fisheries dispute which was settled in 1910 after causing difficulty for over 60 years. Not only did the 2 countries thus set an example to the world, but they emphasised it by signing a treaty of A. 3 Aug. 1911, and again on 15 Sept. 1914, when they signed an Anglo-Amor. Peace Commission treaty. The 2 great Eng.-speaking nations have thus solemnly rejected war in favour of I. A. as a means of settling disputes between them.

Arbitration and the First World War. Although I. A. resolved such important disputes as the Venezuelan boundary question, it played little part in the First World War. The terrible allied losses in 1917 encouraged a 'negotiated peace' movement which was supported by such diverse elements as pacifists, socialists, international financiers, and some of the old diplomatists. A conference of this movement at Stockholm completely failed. On 1 Aug. 1917 Pope Benedict XV (q.v.) in an appeal for peace proposed 'the settlement of all international disputes by A.' Three successive Ger. chancellors paid lip service to A., and the 'central powers' advocated the 'moral force of right,' but said nothing of the restoration of conquered ter. President Wilson replied for the Allies that the actions of the existing Ger. Gov. made any negotiations with them useless.

The experience of the First World War showed that A. is unlikely to succeed after war has begun. The Covenant of the League of Nations unsuccessfully attempted to strengthen A. as a means of settling international differences. The members of the League agreed that if there should arise between us any dispute likely to lead to a rupture they would submit the matter either to A. or to inquiry by the council of the League, and that they would in no case resort to war until 3 months after the award of the arbitrators on the council's report. An award had to be made within a reasonable time and a report by the council within 6 months of submission. The League members also agreed that whenever any dispute arose between them 'which we recognise to be suitable to A. and which cannot be satisfactorily settled by diplomacy,' they would submit the whole subject-matter to A. Matters considered suitable for submission to A. included disputes about treaty interpretation, questions of international law, allegations of breaches of international

obligations, and reparation for such breaches. The court of A. to which a case would be referred would be the court agreed on by the disputants or stipulated in any convention existing between them. Finally, the members agreed that they would carry out in good faith any award made, and would not resort to war against a member which complied with the award; and in the event of any failure to carry out an award, the council would propose what steps should be taken to give effect to it. Experience was to show, however, that in any really serious contingency the covenant was nugatory. See further COVENANT OF THE LEAGUE OF NATIONS and LEAGUE OF NATIONS.

Arbitration since 1922. In the five years following the estab. of the Court of International Justice in 1922, the work of the court itself and the conclusion of special A. treaties by individual govs. reflected a growing belief in A. The court's intervention in a dispute between 2 or more govs. might be secured either for the interpretation of treaties, where specific provision for such reference to the court had been made in advance by the parties; or for the settlement of all justiciable disputes referred to it by both parties; or by one party only if both had accepted the optional clause of the statute of the court (see OPTIONAL CLAUSE); or for an 'advisory opinion' upon any dispute referred to it by the council or assembly. 'Opinions' have been given on a dispute between France and Great Britain as to the nationality (and consequently liability to military service) of Brit. subjects in the Fr. protectorate of Tunis; in disputes between Poland and Germany in 1923, as to the nationality and the rights of Ger. residents in dists. ceded to Poland under the treaty of Versailles; and on the interpretation of the treaty of Lausanne (q.v.) regarding the sovereignty of the dist. of Mosul—a most important question (see IRAQ). The court's jurisdiction has sometimes also been invoked in other ways, e.g. in the case of the *Wimbledon*, which raised certain questions of interpretation of the transport clauses of the treaty of Versailles arising out of the closure by Germany of the Kiel Canal to a Brit. vessel chartered by a Fr. firm to carry munitions to help Poland against Russia. An instance of a case of reference by the consent of both parties or by one party relying on the optional clause is afforded by the agreement in 1924 by Greece and Bulgaria to invite the court's interpretation of the treaty of Neuilly relative to a frontier dispute, and in the same year Belgium invited the 'compulsory' jurisdiction of the court against China in the matter of the denunciation of the Sino-Belgian treaty of 1865, relying on the optional clause, which both had accepted; and also by the *Lotus* case, submitted by France and Turkey in 1926, an important case raising a pure question of customary international law arising out of a collision between a Fr. and a Turkish vessel with resultant loss of life. The readiness of both France and Turkey to submit so important a decision

to the court was some indication of increasing confidence in that tribunal, and the great increase in the number of A. treaties—at least 90 were negotiated between the end of the First World War and 1926, a number much larger than all the treaties concluded during the 19th cent.—was another tribute. Thus far the progress of A. was good, but when the sessions of the eighth assembly of the League began, it was appreciated that the leading govs. of Europe were not prepared to pledge themselves further in regard to A. until more substantial advances had been made in the sphere of security, while the Brit. Gov. showed so little sign of changing its attitude towards the optional clause that the Imperial Conference of that year declared the time premature to accept the obligations of that famous clause. In the Brit. case against Albania on the mining of the Corfu Channel, the majority of the United Nations Security Council upheld (Mar. 1947) the Brit. charges against Albania of laying mines in the channel, but the Russian delegate used the veto and there was no decision. Britain therefore applied to the International Court of Justice which tribunal (Mar. 1948) rejected by 15 to 1 Albania's preliminary objection that in view of Britain's application being unilateral the court had no competence in the matter. The Brit. and Norwegian Govs. have in recent years submitted fishery disputes to A. and abided by the award. See further ARMEMENTS, LIMITATION OF.

See Fred Alexander, *From Paris to Locarno and After*, 1928.

Arboeala, see TORO.

Arboga, auct. tn of Sweden, in the former lan. of Västergötland, situated on the R. Arboga and canal which connect Lakes Hjälmaren and Mälaren. Formerly a place of considerable trade, especially in woollen and iron wares, its prosperity has greatly declined. Once important, too, as the seat of many councils and diets, particularly the parliaments of 1434, 1440, 1471, and 1561. Pop. 10,391.

Arbogast, barbarian officer of the Rom. army at the end of the 4th cent. AD. His nationality is obscure, but the authorities, among them Zosimus and Sulpicius Alexander, say that he was a Frank. He served with distinction against the Goths, and was sent against Maximus, whom he totally defeated in AD 388. He then became the chief minister to Valentinian II, whose murder he contrived in 392, and appointed as his successor one Eugenius, a rhetorician. Defeated by Theodosius, A. committed suicide (394).

Arbois, Fr. tn in the dept. of Jura, on the Quince. It produces good red and white wines, as well as the remarkable *vin jaune* Chateau Chalon which is the only wine other than sherry (q.v.) to profit by the *flowering* of a secondary fermentation. Pop. 3500.

Arbon, industrial tn in the canton of Thurgau, Switzerland, situated on Lake Constance. Originally it was a Rom. settlement, called Arbor Felix. Pop. 9000.

Arbor Day is a day set apart for the public planting of trees in America. The custom originated in Nebraska in 1872 and gradually spread throughout the U.S.A. With few exceptions it is regarded as a legal and public holiday. The date is movable and fixed by proclamation. The same custom is observed in New Zealand.

Arbor Low, megalithic structure near Bakewell, Derbyshire. A circle of 30 stones, now overturned, enclosing a megalithic ruin, is surrounded by a fosse and rampart 250 ft. across. It dates from the late Neolithic period.

Arbor-Vitae (Lat. 'tree of life'). see THUJA.

Arboriculture (Lat. *arbor*, tree; *cultura*, cultivation), scientific cultivation of trees, whether ornamental or useful. In the cultivation of fruit trees such processes as grafting, pruning, and binding are employed; viticulture, or vine-growing, is common to France and S. Europe. For silviculture, or the growing of forest trees for timber, see FORESTRY.

Arbroath, or **Aberbrothock**, royal burgh and seaport of the co. of Angus, Scotland, 16 m. E.N.E. of Dundee at the mouth of Brothock Water. The chief industries are engineering, flax-spinning, sail-making, knitwear manuf., fishing, and farming. A. is noted for its 'smokies' or smoked haddock. It is the Fairport of Scott's *The Antiquary*. Pop. 19,505.

Arbroath Sandstone, geological name of series of sandstones and flags of Lower Old Red Sandstone age exposed in the neighbourhood of Arbroath, Scotland.

Arbuthnot, Alexander (1538-83), minister and poet, b. Kincardineshire. Educ. St Andrews and Bruges, he became Principal of King's College, Aberdeen, in 1569, and was Moderator of the General Assemblies of 1573 and 1577. He wrote three poems, 'On Love,' 'The Praises of Women,' and 'Miseries of a Poor Scholar'; they are printed in Plunkerton's *Ancient Scottish Poems*, 1789.

Arbuthnot, John (1667-1735), physician and satirist, b. Arbuthnot, Kincardineshire, studied at Aberdeen, Oxford, and St Andrews, where he obtained the first recorded M.D. (1696). Appointed regular physician to Prince George and, in 1705, to Queen Anne. Became the cherished friend of Swift and Pope and himself gained a reputation as a wit. A. was the chief contributor to *Memoirs of Martinus Scriblerus*, 1741, in which Pope had a hand. His other prin. works are (1712) *The History of John Bull*, an allegory on the conduct of the Fr. war; *A Treatise concerning the Altercation or Scolding of the Ancients*; and *The Art of Political Lying*, the style of which is modelled on Swift, but without the latter's ferocity. A. was an honourable and amiable man, one of the few who retained the sincere regard of Swift. See G. A. Aitken, *Life and Works of John Arbuthnot*, 1892.

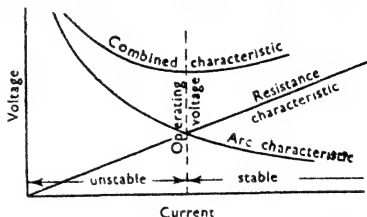
Arbutus, genus of evergreen shrubs of the order Ericaceae, occurring in Europe, the E., and N. America. *A. unedo*, the strawberry-tree, mentioned by Virgil, bears a berry which resembles the

strawberry. *A. andrachne* is native to SE. Europe and Asia Minor.

Arc, **Joan of**, see JOAN OF ARC.

Arc (Lat. *arcus*, a bow), in geometry, a portion of a curved line. The straight line joining its extremities is called a chord (q.v.). If the A. of a circle subtends an angle α at the centre of the circle then the length of the A. is $\alpha/360$ of the circumference. See also ARC, ELECTRIC, and CIRCULAR MEASURE.

Arc, Electric, luminous discharge of appreciable duration. If 2 carbon rods are fixed end to end about $\frac{1}{4}$ in. apart and a direct current voltage of 50-70 volts is applied to them, the voltage is insufficient to break down the gap. But if the rods are made to touch, or touched with another carbon, and then drawn slowly



apart, an A. develops between them, persisting as long as the distance does not exceed a certain limit. As the carbons are separated the voltage across the A. rises and the current decreases. The A. does not follow Ohm's Law; it has a falling volt/ampere characteristic and is unstable. It is therefore always connected in series with a resistance such that the combined characteristic has its minimum at the operating voltage. In alternating current circuit the A. is momentarily extinguished when the current passes zero value. If the voltage passes zero at the same moment (voltage and current in phase, non-inductive circuit) it may not reach a sufficiently high value to maintain the A. before the A. space has cooled (or become de-ionised). To maintain a steady A. an inductance is inserted so that when the current reaches zero the (leading) voltage is near its peak. When a power circuit is opened an A. develops between the separating contacts of the switch or circuit-breaker (q.v.). The A. may be extinguished by air blast or by immersing the switch in oil. In direct current controllers magnetic blow-out is used: the A. path is deviated by magnetic action. See DISCHARGE; ELECTRIC LAMPS; OSCILLATORS; RECTIFIERS (mercury A.); TRANSFORMERS.

Arc Furnace, see FURNACES.

Arc Lamps, see ELECTRIC LAMPS.

Arc-suppression Coil, or Petersen coil, a reactor connected from the neutral point of a 3-phase alternator or transformer to earth. In case of a fault (arc) to earth on the transmission line, the arc burns in parallel with the capacitance to earth of the line. In the circuit formed by the alternator - line - capacitance/arc - earth - reactor, the latter takes a lagging current,

the capacitance a leading current, and if the reactor is correctly dimensioned the two cancel out and the arc is quenched.

Arcs, anct tn of Phoenicia, bp. of Alexander Severus, from whom it took the name of Caesarea A.

Arcachon, Fr. coastal tn. in the dept of Gironde, at the entrance to the A. basin—a lagoon of 60 sq. m. It is a health resort near magnificent pine woods, and with a very mild climate. The chief industries are oyster-breeding and fishing. Pop. 14,000.

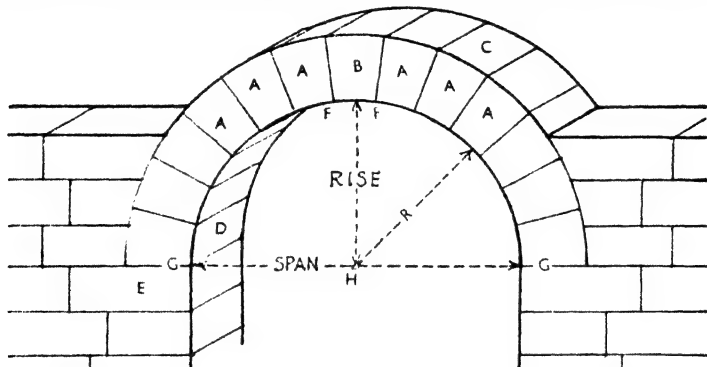
Arcade, range of arches carried on piers or columns. The earliest examples are found in Rome, 1st cent. bc. Rows of arches were frequently used as decoration.

Arcadius (378–408), Rom. emperor, elder son of Theodosius the Great, created Augustus in 383. On his father's death in 395, A. received the E. prefectures of the Orient and Illyricum. Throughout his reign he was the tool of successive ministers, and was greatly influenced by his wife Eudoxia (d. 404).

Arcagnuolo, L', or Cione, see ORCAGNA.

Arcani *Disciplina*, see DISCIPLINA ARCANI.

Arcanum is the neuter of the Lat. adjective *arcanus*, used as a substantive. It had the significance of a profound mystery, or, in a more particular sense, one of the alchemist's secrets of nature, such as the elixir of life, the philosopher's



PARTS OF AN ARCH. AA, Voussoirs. B, Keystone. C, Extrados. D, Intrados or soffit. E, Abutment. F, Crown. G, Springing line. H, Centre. R, Radius.

internally or externally, in Early Christian, Lombard, and other forms of Romanesque architecture, and less commonly in Gothic. They are described as 'arcading.' In modern building, a covered gallery with shops on either side is called an A.: e.g. the Burlington A. in London.

Arcadelt, Jacob (c. 1505–c. 1567), Netherlands composer, who went to Italy in his early thirties and entered the Papal Chapel in Rome in 1540. From about 1555 to his death he lived in Paris. He wrote masses and motets, but is particularly famous for his lt. madrigals.

Arcadia, central plateau of Peloponnesus, surrounded by mts and therefore relatively backward in ant times, owing to difficulties of communication. The inhab. were principally engaged in hunting and the rearing of goats; hence their worship of Pan (q.v.), originally an Arcadian god. The prin. tns were Mantinea, Tegen, and (after 371 bc) Megalopolis. The Arcadians subsequently joined the Achaean league, and became subject to Rome in 146 bc. Popular fancy has attributed to A. a life of idyllic happiness.

Arcadius, Gk grammarian of the 2nd cent., a native of Antioch. An epitome of the works of Herodian has been attributed to him, but without sufficient proof.

stone, etc. The plural form *arcana* is also used, sometimes as though it were a singular noun.

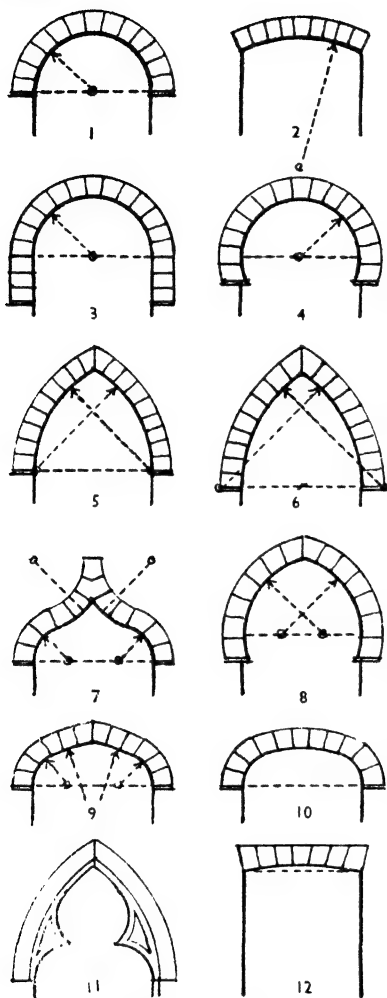
Arcesilaus (316–241 bc), Gk philosopher, and founder of the Middle Academy, b. at Pitane in Aetolis. His doctrine, which is known only through the writings of others, was a form of agnosticism based on the conviction that intellectual certainty is impossible.

Arcevia, lt. tn in the Marches (q.v.), 29 m. SW. of Ancona (q.v.). Pop. 16,500.

Arch, Joseph (1826–1919), Eng. politician and founder of the National Agric. Labourers' Union, b. Barford, Warwickshire. Justin McCarthy calls him the 'emancipator of the agric. labourer.' He represented the NW. div. of Norfolk as a Liberal in the Parliaments of 1885 and 1886; and he was returned again in 1892 and 1895.

Arch, self-supporting structure composed of blocks of brick or stone, and capable of carrying a superimposed load over an opening. As are usually curved in various forms, but may be flat or nearly flat. The component blocks are generally wedge-shaped; but, in rough work, are occasionally rectangular with the joints between them increasing in width from the underside outwards.

The principle of the A. was known to the



TYPES OF ARCHES

1. Semicircular. 2. Segmental. 3. Stilted.
4. Round Horseshoe. 5. Equilateral.
6. Lancet. 7. Ogee. 8. Pointed Horseshoe.
9. Four-centred. 10. Elliptical. 11.
Cusped. 12. Flat (cambered).

and Egyptians, Assyrians, and Greeks; but A.s were seldom used until Rom. times, when the semicircular A. was universally adopted. This form continued in fashion during the phases of architecture known as Romanesque (q.v.) in W. Europe, and Byzantine (q.v.) in E. Europe.

Pointed A.s, first used in the Middle E. about the 7th cent. AD, were employed in Mesopotamia and Egypt from the 9th-10th cents. onwards, and were introduced into England and France, probably by returning crusaders, at the end of the 11th cent. (see ARCHITECTURE, *Gothic*). In Muslim countries (see ARCHITECTURE, *Muslim*), mainly S. of the Mediterranean, the 'horseshoe' A., sometimes round and sometimes pointed, was popular. In Renaissance architecture, throughout W. Europe, round A.s replaced the pointed type.

The prin. terms connected with any form of A. are the span, rise, and springing line; and the various parts: abutment, archivolt, crown, extrados, impost, intrados, keystone, spandrel, springer, voussoir (see fig., p. 415, and separate definitions). The prin. types of A., according to their shape, are semicircular or 'round,' segmental, stilted, round horseshoe, equilateral (pointed), lancet (pointed), four-centred (pointed), pointed horseshoe, three-centred, cusped, elliptical, and Venetian (see illustration).

To support the component blocks of an A. during its construction a framework of centering (q.v.) is required.

Arch, Triumphal. In order to celebrate the victorious return of Rom. generals, an A. was erected either across roads or at the entrance to cities. The first known T. A.s were those erected by L. Stertinius in Rome in 196 bc. He erected 2, in the Circus Maximus and the Forum Boarium. During the reigns of the Rom. emperors money was lavished on them. Frequently they were decorated with bas-relief designs and adorned with laudatory inscriptions. The total number of T. A.s that were built by the emperors is about 40, of which number 3 remain standing in Rome. These were built by Titus in AD 82, Septimius Severus in AD 203, and Constantine AD c. 315. Other examples exist in other parts of the old Rom. Empire: e.g. at Rimini, Susa, Verona, Ancona, and Orange (France).

Inspired by a similar motive, Napoleon resolved to adorn Paris with 4 of these structures. In 1806 he caused to be erected the Arc de Triomphe du Carrousel. It is situated between the Louvre and the Tuilleries, and follows the pattern of the A. erected by Septimius Severus. In the same year another A. was commenced beyond the Champs-Élysées. This is the Arc de Triomphe de l'Étoile. Its erection, however, was not completed till 30 years later. The 'Marble A.' in London, 1825 (modelled on the A. of Constantine at Rome), originally stood in front of Buckingham Palace, but was transferred to its present site in 1851. The A. now at the top of Constitution Hill, 1828, originally the N. entrance to Buckingham Palace, was moved to its present position in 1888. This A. is based on the A. of Titus at Rome.

Archaean (Gk *archaios*, anct), geological name for the oldest crystalline rocks in any region. A. rocks formed during Pre-Cambrian (q.v.) times, which extended for about 3,000,000,000 years,

ending when the Cambrian Period began 500,000,000 years ago. Fossil remains of stratigraphical value are absent from A. rocks, and until it became possible to date the formation of a rock from the radioactive decay of certain of its minerals it was impossible to determine the ages of A. rocks. It is now clear that A. rocks were formed over this immense span of time, and the term A. System should be dropped in favour of names describing each div. of the A. The A. includes unaltered sedimentary and igneous rocks, together with metamorphic schists and gneisses. It underlies much of Africa, Canada, Siberia, Scandinavia, W. Australia, and Antarctica. Isolated outcrops of A. rocks occur in W. Britain (for details see PRE-CAMBRIAN).

Archaeology. The standard definition of A. as the scientific study of antiquities has the merit of being wide in application and easily understood. The word itself combines Gk *archaios*, anct., with a suffix *-logia*, denoting a branch or system of knowledge, and was first used by an Eng. author in the early years of the 17th cent. Any systematic description and orderly study of antiquities must necessarily cover a very wide field, extensive not only in time but equally in geographical space. It may be said to embrace the whole hist. of races and things from the earliest times until yesterday. Whether this study is an art or a science has never been settled; the point does not really matter, and A. may well be regarded as the art which deals scientifically with the study of all remains of human activity. Its function is interpretation as well as record.

A. is very commonly studied on a selective territorial, regional, or subject basis. Thus at the present time there is active interest in the field and comparative A. of America, Egypt, India, the Near E., the Far E., the U.S.S.R., Scandinavia, and Yugoslavia, as well as of Europe generally and of Greece and Rome. The basis is sometimes more local, as in the A. of a natural region, dept., or co., and there are frequent studies of particular sites as of Stonehenge, Hadrian's Wall, the Köln-Lindenthal Neolithic farmsteads in Germany, or the Swedish ship-burials of Valsgarde. There is also the A. of particular problems, e.g. deserted medieval vills. In Britain, the spread of the Wessex Bronze Age culture, the Rom. settlement of N. Africa, the use of radio-active carbon in dating remains. Again, A. is often considered in a period or chronological context; thus in Britain there is prehistoric, Rom., Dark Ages, and medieval A., while the archaeological aspect of special subjects, e.g. church fittings, castles, heraldry, monastic remains, numismatics, and place-names, forms yet another large and important branch of the study.

The difference between the archaeologist and the antiquary is nowadays one of academic and literary rather than practical interest. In circumscribed thought, perhaps, the archaeologist is the excavator who works in the field, exemplified often by the prehistorian, while the

antiquary, the medievalist, reads, carpet-slipped, in his study which he leaves only to visit churches. In modern practice they are one and the same, and the aims and often the methods of the one are those of the other. There is no difference between the technique of excavation on prehistoric, Rom., or medieval sites.

It would be difficult to say when man was not interested in his past. There has been such an interest in Britain and on the Continent at least since the 5th cent. AD. The professed antiquary was recognised in Britain in 1533 when Henry VIII conferred the title of 'King's Antiquary' on John Leland, authorising him to travel in search of antiquities and anct documents. The Brit. topographer-antiquaries, Leland (15061-52), John Stow (1525-1605), John Speed (1552-1629), and Wm Camden (1551-1623) (qq.v.), were much occupied with documentary hist., but sometimes found space for mention of antiquities. In the 17th and 18th cents. studies in O.E. flourished; beside them grew an interest in objects as antiquities. It was largely a collector's interest, enhanced by a topical vogue for classical gems and sculpture, fossils, and curiosities brought home by travellers from abroad. This acquisitive interest did focus attention on the worthy aspects of some notable Brit. field monuments, and Stonehenge in particular came in for a good deal of speculation. The thin thread of fact which ran through many speculative theories, put forward by men moved more by diligent curiosity than by learning, paved the way for the acceptance of objective A. When first-hand inquiry took the place of unsupported theory, A. could build on the foundations laid by the antiquarians. Many country gentlemen, chiefly parsons and doctors, gave their time and more to practical research, frequently enriched their cabinets by disembowelling the graves of their local ancestors, and often pub. in a satisfactory way the results of their pursuits. See PREHISTORY.

It was only natural that in the marshalling and exhibition of these growing private and public collections of relics some sort of grouping and order should make itself felt. On a broad basis of material there were objects of stone and metal, but the most obvious grouping was that of function. It was perhaps a classical scholar who recalled that the Graeco-Rom. world had some knowledge of the early use of materials; that man shaped tools of stone before he had discovered the properties of metals, and that he used bronze before iron. A practical div. of prehistoric antiquities according to these ages of stone, bronze, and iron was made about 1836 by C. J. Thomsen, Curator of the National Museum of Antiquities in Copenhagen, and his colleague Worsae was able to prove the soundness of the div. by field work. In Britain A. gained much support from Lord Avebury who in 1865 pub. the first ed. of his *Prehistoric Times*, and from the new and sustained interest in the process of evolution.

A variety of circumstances combined to secure the growth of the new idea of A. National or local societies were formed for the study of its sev. branches. The examination of churches became an accepted genteel occupation. There was an impelling interest in oversea expeditions to the classical lands. Austin Layard was at Nineveh, the cap. of the anct Assyrian Empire, in 1845; by 1870 Schliemann had begun his spectacular work at Troy; and in 1881, under Brit. auspices, the Egypt Exploration Fund had been inaugurated. In Britain the gov. had recently purchased from the Earl of Elgin his collection of marble works from the Parthenon, and even the Great Exhibition played its part. Above all, the work of Darwin and Wallace gave an extraordinary stimulus to the scientific world at large; it created a new epoch in general thought, and in particular gave a new meaning to the study of our early ancestors. The acknowledgment that humanly flaked flint tools were contemporary with the gravels of the R. Somme near Abbeville in which they were found completely disqualified the hitherto widely accepted theological story of the descent of man. With the principles of scientific excavation and the study of stratigraphy laid down and practised in Britain by Lt.-Gen. A. H. Pitt-Rivers (q.v.) (A. H. Lane-Fox, 1827-1900) A. was at last an exact discipline. In the present cent. the scientific method of archaeological excavation has been fully developed. It is with the use of techniques drawn from the well-estab. sciences of geology, geography, physics, botany, biology, and chem., and with a proper application of a background of hist., economics, and sociology, that the archaeologist now considers the environment of his ancestors. His is before everything a social study. The bones, the jewellery, and the pots, vitally interesting and important though they are in themselves, are above all pointers and guides to a social system. We want to know about food and shelter, and indeed the whole technique of living. It is not simply a question of digging up the past, but of what man has done in the past; under what conditions he has made good and where and why he has failed.

The discipline of modern A. in all its branches may be considered under the following headings:

Discovery. Relics of interest are very often obtained by chance from pits and quarries made for industrial materials, and from excavations undertaken for new buildings and public utility services. Farmers, gardeners, burrowing animals, and deep-sea fishermen are also potential discoverers of objects of archaeological interest. Even a modern sexton may disinter in an age-old burial ground the handwork of his predecessors. Casual discoveries are sometimes revealed by the natural processes of weathering and erosion along the sea coast and by the side of rvs. It sometimes happens that anct material, re-used for other than its original purpose, is recognised by an observant eye; at Steyning in Sussex, for example, a

Saxon sculptured slab placed face downwards had for cents. served as a door-step. Industrial requirements have sometimes been responsible for the wanton destruction of known anct sites, but conditions both in Britain and abroad are now generally improved. There are sev. other indications which may point the way to archaeological discovery, among them the conformation of the ground itself (burial-mounds, camps, dikes, and conspicuous earthworks); the provenance of museum objects; and literary evidence, including that of legends and place-names. Many archaeological sites of importance have been revealed for the first time on photographs taken from the air. Outstanding recent examples have been a series of Rom. forts and camps in Scotland, which will necessitate a complete revision of the currently accepted thought about the Rom. occupation of that country; the detection of Rom. viticulture systems in S. Italy; and the recovery of the plans of sev. medieval monastic sites in Britain.

Certain features such as low mounds, the low banks of fields, and shallow ditches which might well escape examination on the ground are often emphasised by shadow in photographs taken from the air under suitable conditions of oblique light. Long filled-in ditches, and the holes made for the posts and beams of anct timber structures, are revealed by the more luxuriant growth of the crops above them, while the lines of buried walls and roads are often shown by sparse vegetation limited in growth by the shallow soil covering the masonry and metalling. Much depends on the vegetation or crop; grass is of no help except in drought conditions, but oats, barley, and lucerne all develop satisfactory crop-marks.

Excavation is the controlled scientific examination and investigation of a site or object of known archaeological importance. Its aim is to recover and record, to trace development and purpose, and to place the resulting knowledge in a human and living background.

In the present practice of A., excavation is undertaken only for the sake of obtaining new knowledge or for the solution of a particular problem. Uncontrolled treasure-seeking and digging for mere pleasure are not encouraged.

The condition and state of preservation of archaeological remains vary not only with the climate and soil but also with the nature of the material. In general, organic remains, apart from bone and ivory, tend to disintegrate, though in favourable conditions of moisture and temp., as in the peat-bogs of N. Europe, human bodies themselves with hair and skin, and objects of wood and bone, are all well preserved. Vegetable remains persist as seeds and pollen. Very dry climates exercise a preservative effect, and nowhere is this more apparent than in the famous tombs of the Pharaohs in Egypt and in the civilisations of Arizona. Equally the conditions found in the subarctic regions of N. Europe, particularly in N. Russia, Greenland, and Alaska, preserve anct remains at a constant low temp.

Emergency or rescue excavation is undertaken where the site is in danger of destruction; in a selective excavation, perhaps the most usual, the archaeologist obtains leading information about a site, its form and chronology; a complete excavation in which a site is investigated right down to the natural bed-rock should reveal its whole story in detail. The remarkable modern advances in the technique of excavation developed in Britain, Holland, and Germany are now being applied to the A. of the E. and Near E.

In the interpretation of his discoveries, the archaeologist is much concerned with function and chronology.

Function in its broadest aspect is a study of social behaviour and organisation. The archaeologist is interested in pots and brooches, tools and weapons, the form of houses, temples, and tombs, for the light they throw upon the lives and environment of the people who made and used them. Food, shelter, art, material, culture, and trade are all a measure of man's success or failure. There is much more in the evolution of the bronze age, for example, than a mere transition from a flat casting to a sharp-edged cast socket with a loop for the haft.

The estab. of a *chronology* or the dating of his discoveries is the archaeologist's constant task, and to the layman the frequent use and classification of stage or period, culture, and phase, with their sub-divs. and local variations, is indeed confusing. The stage names (see PREHISTORY AND STONE AGE) are convenient main divs., while culture and phases denote groups and variations which existed within the period. Cultures are usually named from the place (the type station) where they were first recognised, but may be named serially or alphabetically.

Chronology may be considered as relative to a known man-made background, or more broadly in an absolute sense by reference to a natural time scale dependent upon solar and geological phenomena. The consideration is one of degree; it is obviously not possible to measure the events of the half a million years old Palaeolithic period with the same precision as those of the Roman occupation of Gaul or Britain.

The typological development of objects and their arrangement in an evolutionary sequence sometimes provides a form of relative chronology. It does so in the case of the axes of the European Bronze Age, and with much primitive pottery. But certain objects, and coins particularly, show a marked degeneration, and older forms not infrequently exhibit a version of early states. The repeated association of forms at the same stage of development, e.g. in hoards of metal objects, often strengthens belief in a chronological sequence, but the comparative study of types against a relative time scale is always fraught with difficulties.

The most reliable criterion of relative age comes from the proper interpretation of the stratigraphy of an ancient site. The principle is a simple one: that any given

layer with the objects contained in it (provided that there has been no subsequent disturbance) is relatively older than the one covering it and not as old as the one upon which it itself lies. It is a principle very well known in geology. The human occupation of a site, be it represented by cave, house, temple, fort, or burial mound, results in the cumulative collection by purpose or by accident of a variety of objects. Buildings fall down, burn, or are demolished, and new ones are erected on the site. New floors cover the levelled debris of a former occupation. Forts are strengthened against new assaults. A riv. bursting its bank may flood the area; the relative level of land and sea may alter by reason of land movement; and war or plague may obliterate every trace of human habitation. In all such cases the proper interpretation of the stratigraphy will elucidate the hist. of the place and its inhab.

The various layers can be dated by the objects found in them (provided again that there has been no later intrusion), but it must be remembered that any particular layer must have been formed after the date of the latest object which it contains. In all excavation work a primary object is to reveal the sequence in which stratified material was formed or laid down, and from this foundation knowledge the hist. of the site is built up. For this reason stratigraphy is always examined in a horizontal as well as a vertical plane. It may be mentioned that much of our knowledge of the Pleistocene period, with its various ice sheets and pluvial phases, has resulted from detailed studies of stratigraphy in Europe and N. America, studies by geologists and archaeologists in association. The brilliant and convincing speculations of Sir Cyril Fox in his consideration of Bronze Age funeral ceremonies are based entirely on a proper appreciation of the stratification found in the excavation of burial mounds.

Yet further light is thrown on chronology by the geographical distribution of man's relics, which are distributed through space as well as through time. Migration, colonisation, and trade routes explain the spread and development of various cultures. Distribution seen in a worldwide geographical setting, and the adequate use of maps, is a relatively new branch of A. in which O. G. S. Crawford (q.v.) and Sir Cyril Fox have, in Britain, played a leading part. By its use such diverse problems as the effect of the Asian and African culture streams on the Upper Palaeolithic of W. Europe, the course of the gold and amber trade in the prehistoric world, and the outcome of the travels of medieval Gothic masons and sculptors have all been placed in a proper perspective.

Absolute dating expresses man's earliest activities in terms of years, and in this way there is made possible an accurate comparison of cultures of widely separated regions. The time expressed by human records covers, perhaps, some 5 millennia. In Egypt and Babylonia, lands with ancient

written hist., it is possible to correlate to some extent the evidence of written King Lists with astronomical data and thus to form a calendar. With some reservations Egyptian hist., which is the most anct known, can be carried back to the end of the 4th millennium BC. By cross-dating and noting the synchronisation of various developments in such objects as pottery and metal goods, it is possible to link Egypt reliably with the civilisation of Crete and only a little less authoritatively with that of Greece. There are, however, many difficulties, some unsurmountable, in the extended application of this form of absolute chronology to the periphery of the prehistoric world. For convenient tables of archaeological dating down to AD 1000 see PREHISTORY.

The modern archaeologist, and especially the prehistorian, is much indebted to the science of geochronology, which is concerned with the establ. of absolute time scales for the very remote past. Its main methods deal with tree-ring dating, varve analysis, and radio-carbon dating.

Dendrochronology, or 'tree-ring' analysis, has for its purpose the dating of timber by a study of its ann. growth-rings in conjunction with astronomical phenomena. It is used to date timber itself, and may date the structure of which the timber forms a part, or with which it is associated, and also to obtain information about regional climatic changes, and the relative growth of trees on various sites at different periods, as well as to examine the effects of biological conditions on tree growth. There is an obvious difficulty in dating timber structures by this method, as the timber may have been re-used or cut some time before use. Very successful results have been obtained, however, particularly in the prehistoric and historic Indian vils. in Arizona, and active research is now being undertaken in America, Scandinavia, Britain, and Germany. The matter is discussed fully by Prof. Zeuner in his book noted below.

Varve analysis consists of the detailed examination and plotting of laminated geological deposits known to have been laid down annually. Much research has been undertaken in the late Ice Age deposits of Scandinavia and N. America, where successive bands or varves of silt and clay were left each year by the retreating ice sheets.

By linking the observations with conditions present in a Swedish lake known to have been drained in 1796, de Geer produced a time scale in years; in the Baltic region it covers a period of approximately 10,000 years, and according to de Geer's scheme it is thought the ice lake of the Baltic may have ceased to exist in 1912 BC, though this date is not insisted upon. Much work still remains to be done in correlating and cross-dating the results obtained in various centres of observation. Radio-carbon dating, a side-line of atomic research first pub. in 1949 by Prof. W. F. Libby of Chicago Univ., is a method of determining the age of organic material by reference to its content of radioactive

carbon. The reliability and applicability of the method are still undergoing test, but it has been applied in America and the Near E. with satisfactory results, and work is now proceeding on prehistoric material from Europe. If certain practical difficulties can be overcome, radio-carbon dating is likely to be the most remarkable advance in modern A. For the theory of the method see Willard F. Libby, *Radio-carbon Dating*, 1952, and *Antiquity*, xxiii (1949), pp. 113-14; xxv (1951), pp. 145-9.

Undersea Archaeology. The development of the 'aqualung,' and the recent exploitation of free-diving and the use of powerful suction hoses, have given rise to much interest in the examination and recovery of archaeological relics from the sea bed. Expeditions in the Mediterranean, especially along the coasts of France, Italy, N. Africa, and Spain, have located the sites of many wrecked ships from which have been salvaged remains of the cargoes—amphorae with corks and wax seals still in place, marble statuary, bronze figures, many architectural fragments of carved and moulded Gk marble—as well as coins and occasionally anchors of the ships themselves. One of the earliest exploits was the examination in 1907-13 of a sunken galley off Mahdia, a small Tunisian port and the recovery of many of the works of art which formed part of its cargo; this wreck has recently been explored once again. At Saint-Tropez, in 1951, were recovered a large number of blocks of Carrara marble, the remains perhaps of a temple which were being carried by sea in the 2nd cent. AD and were lost in a wreck at the harbour mouth. The lay-out of the Rom. port at Cherchel on the coast of Algiers has been explored by free-divers, and the Rom. harbour installations at Tyre and Sidon have also been investigated in very recent times. In Gk waters notable undersea discoveries have been made at Artemision, Anticythera, Marathon, and the Piraeus. This branch of A. is still in its infancy, though it grows lustily; it is limited more by the great cost of the apparatus it requires than by lack of interest. In Britain the conditions of the sea are not generally favourable for such research, though in 1912 the Society of Antiquaries employed a diver to investigate a Rom. vessel carrying a cargo of Samian pottery from Gaul to London which was wrecked off the Pudding Pan Rock near Whitstable in the estuary of the Thames. Much of the material recovered from undersea investigations is in the Museum of Maritime Hist. in Marseilles, where also may be seen archaeological relics brought up by the use of suction apparatus. See AQUALUNG. See also Philippe Dole, *Promenades d'Archéologie Sous-Marine*, Paris, 1952; pub. as *4000 Years under the Sea*, London, 1954. This book contains a detailed bibliography.

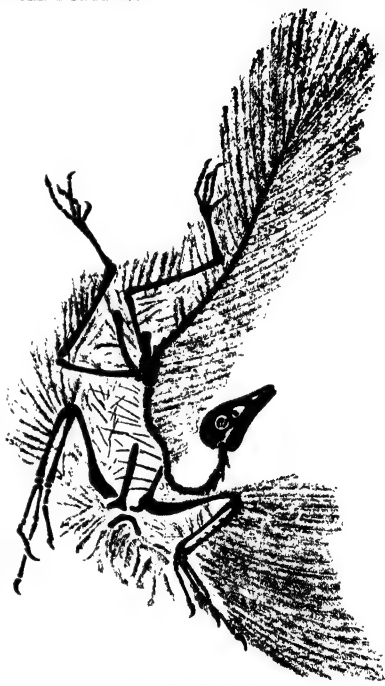
Some recent research and discovery in Britain. Expert scientific examination has proved Piltdown Man (q.v.) to be a hoax. Excavation of a mesolithic habitation site at Star Carr, Seamer, Scarborough, has yielded much information

about the environment of these people who used flint awls, burins, and scrapers to fashion barbed fishing-points of red deer antler and to work birch-bark which was stored in carefully made rolls. Much research has been done on the petrological determination of stone axes. At Stonehenge (q.v.) 3 structural periods have been demonstrated by excavation, and carvings on certain of the monoliths were noticed for the first time. A native settlement dating from the earliest years of the Christian era has been excavated at Jarlishof in the Shetland Is., and an auct settlement at Skara Brae, Orkney. Deep ploughing in E. Anglia has resulted in the discovery of many relics, especially fine quality metal-work, of the Early Iron Age. A descriptive survey of the Rom. roads of Britain has been made, and important discoveries of Rom. material have been made during excavations in the war-damaged areas of London, Canterbury, Exeter, and Dover, and in a carefully planned long-term study of Hadrian's Wall. Two important portrait busts were found in a Rom. villa at Lullingstone, Kent, in 1949. The Sutton Hoo ship-burial, excavated in 1939, has received much attention since, as has the pagan Saxon period in general. In 1954 excavations on the site of the bombed Mercers' Chapel in Cheapside in the City of London revealed an early figure of Christ of outstanding beauty. It is described as one of the major archaeological finds of the cent. A special group of scholars has been formed to study the problem of deserted medieval vills., and there is very wide interest in the adequate preservation of auct monuments and historic buildings of all periods. For details reference should be made to the annual reports and bulletins of the Council for British A., the national representative of archaeological opinion.

The literature of A. is widespread and somewhat unwieldy; the following authoritative and up-to-date books, most of which contain good bibliographies, are outstanding in their respective spheres: R. J. C. Atkinson, *Field Archaeology*, 1946; Grahame Clark, *Archaeology and Society* (2nd ed.), 1947; V. G. Childe, *Man Makes Himself*, new ed. 1948; G. E. Daniel, *A Hundred Years of Archaeology*, 1950; F. E. Zeuner, *Dating the Past*, 1950; K. M. Kenyon, *Beginning in Archaeology*, 1952; O. G. S. Crawford, *Archaeology in the Field*, 1953; R. E. M. Wheeler, *Archaeology from the Earth*, 1954; M. B. Cookson, *Photography for Archaeologists*, 1954; R. L. S. Bruce-Mitford (ed.), *Recent Archaeological Excavations in Britain*, 1956; I. W. Cornwall, *Bones for the Archaeologist*, 1956.

Of equal value for general interest and as a basis of fieldwork are the second and third eds. of the illustrated *Regional Guides* of sites and buildings in the care of the Ministry of Works; the Ordnance Survey maps of the major visible antiquities of Great Britain older than AD 1066; the National Period Maps (Monastic, Roman, Dark Ages, the Trent Basin, Salisbury Plain, etc.) pub. by the Ordnance

Survey; *Notes on Archaeological Technique* (Ashmolean Museum, Oxford, 1950 ed.); and J. Hawkes, *Guide to Prehistoric and Roman Monuments in England and Wales*, 1951. See also ALIGNMENT; BARROWS; BEAKER FOLK; BROCH; BRONZE AGE; CAIRN; CAVE ART; CRANNOG; EARTHWORKS; FLINT IMPLEMENTS; HILL-FORTS; IRON AGE; MEGALITH CULTURE; MONUMENTS, ANCIENT; PREHISTORY; ROMAN REMAINS IN BRITAIN; SAXONS; STONE AGE; STONEHENGE; WHITE HORSES AND HILL FIGURES.



ARCHAEOPTERYX

The earliest known bird, *Archaeopteryx*, as it was found.

Reprinted with permission from E. H. Colbert: 'Evolution of the Vertebrates.' Copyright 1955, John Wiley & Sons, Inc., New York.

Archaeopteryx (Gk *archaios*, auct; *pteryx*, wing), Jurassic fossil bird found in the Solenhofen lithographic stone of Bavaria, and which presents characteristics of birds and reptiles. It is the oldest known bird. Its size was that of a crow, it had teeth in both jaws, a feathered tail, and 3 claw-like digits at the end of each wing. Two specimens only are extant.

Archaism (Gk *archaios*, old), the retention, or imitation, of what is old or

obsolete, especially in language and art. *Archaic* means primitive, antiquated, no longer in common use.

Archangel (Russian *Arkhangel'sk*): 1. Oblast in the N. of European Russia, adjacent to the Arctic Ocean. It is predominantly lowland covered by coniferous forests. Area 229,400 sq. mi.; pop. (1956) 1,205,000, mostly Russian (since 11th cent.), some Nenets (q.v.). It has lumbering and wood-processing industries, fishing, and dairy cattle breeding (Kholmogory breed). The prin. tns are A., Kotlas. The famous Solovetskiy Monastery is situated here. A. belonged to Novgorod until 1478, then to Moscow. It is an area of banishment and labour camps.

2. Cap., economic and cultural centre of the above, at the head of the N. Dvina delta. The largest saw-milling centre and prin. lumber port of the U.S.S.R., it is open to navigation from May to Oct. Pop. (1956) 238,000 (1897, 20,000; 1917, 48,000; 1939, 281,000). Founded in 1583, after the estab. of Anglo-Muscovite trade, A. enjoyed the monopoly of Muscovite foreign trade until the construction of St Petersburg. Since 1702 it has been the administrative centre of the Russian N. During both world wars it was a major supply port for Allied goods. A. was occupied in 1918-19 by Allied troops under Brit. leadership and was the seat of an anti-Bolshevik gov. which held out until Feb. 1920.

Archangel, chief or leading angel. Both Jewish and Christian tradition venerate seven of them (see Tobit xii. 12, 15), of whom 3 only are named in the Bible—Michael, Gabriel, and Raphael. The others are known as Uriel, Raguel, Sariel, and Jeramel. It has been suggested that the conception of 7 A.s is borrowed from the Zoroastrian belief in the Amshaspands. There are radical differences, however, in the 2 beliefs apart from the fact that there were thought to be only six Amshaspands. The notion of Persian influence on Judaism especially in angelology is disputed. Any influence that existed may have been in the reverse direction. See *ANGEL*, also in Jewish Encyclopedia.

Archangel, name given chiefly to *Galceadalon luteum*, a perennial wild herb.

Archbishop, bishop of superior rank, or one who has jurisdiction over other bishops. The title when it first came into existence did not imply that the holder had metropolitan power. An A. is usually a metropolitan, presiding over a prov. or group of dioceses. The terms, however, are not interchangeable. The title seems to have been first used in the early Church, being used by Athanasius and by Gregory to imply respect to their predecessors. In the E. Church the title was much more common than in the W., but gradually, with the right to summon prov. councils, the metropolitans began to assume the title of A. A.s, however, were not allowed to assume authority independently of the papacy, since they were compelled to receive

the pallium from Rome. In the Rom. Church the right to wear the pallium is only granted to such A.s as have metropolitan jurisdiction, since there are a number who have merely titular archbishoprics. Until the pallium is received and the oaths of fidelity and obedience are taken to the papacy, the A. is only recognised as the A. elect, and cannot use his full powers. In England the Anglican Church is governed by 2 A.s, the A. of Canterbury, who is also 'Primate of all England,' and the A. of York, who is 'Primate of England.' At the time of St Augustine the plan was to divide England into 2 provs. with 2 A.s, 1 at London and 1 at York, who were to take precedence according to seniority, but during the pre-Reformation period the metropolitan of Canterbury exercised the functions of papal legate throughout all England. At the present day he possesses powers over both provs., e.g. he can grant licences for marriage which are valid in both provs. Amongst his other powers he can grant Lambeth degrees in music, law, and theology. As the metropolitan of the S. prov. he is the guardian of all vacant sees, and appoints to benefices during such vacancy. He has also jurisdiction over all bishops within his prov., and has the privilege of visitation and deprivation which is not exercised by the A. of York. It is his privilege to crown the kings and queens of England, and to consecrate all bishops within his prov. He is also an eccles. commissioner for England. He takes precedence immediately after the princes of royal blood. The powers of the A. of York are very similar to those of the A. of Canterbury, with the above exceptions. The A. of York has the privilege of crowning the queen consort, and of being her perpetual chaplain. He is one of the eccles. commissioners of England, takes precedence after princes of the royal blood, and the lord chancellor. A.s have the title of His Grace, and Reverend Father in God.

Archdeacon, high officer of the Christian Church whose rank is directly subordinate to that of bishop. He is the bishop's vicar, viceroy, or representative (*oculus episcopi*), attached to the cathedral, having jurisdiction over the clergy and authority to manage the affairs of part of the diocese (his archdeaconry). He presides over a court where certain eccles. causes are heard. Originally he was the chief of the deacons who assisted the bishop in eccles. affairs. The distribution of the dioceses into archdeaconries cannot be assigned to any certain time. In the 5th cent. A.s rose from mere bishops' assistants, and took upon themselves some of a bishop's powers and privileges. Gradually they acquired a recognised position apart from the bishop, and claimed a jurisdiction to themselves. In the 13th cent. protests from sev. synods were successful in securing a curtailment of their powers by episcopal courts. It is their special duty to inspect the buildings within their range of supervision, and to undertake the repair of

eccles. property. A.s are obsolete in the Rom. Catholic Church in England.

Archduke, title borne by members of the former Austrian royal family. It denoted a rank above all other dukes, bearing superior powers and rights.

Archegoniata, botanical term applied to the div. of the vegetable kingdom which contains plants having an archegonium (q.v.). It includes the Bryophyta (liverworts and mosses), and the Vascular Cryptogams (ferns and scaglinellas).

Archegonium (Gk *archē*, origin; *gonos*, offspring), the female sexual organ of the prothallus of such plants as the mosses and ferns. It is flask-shaped with a slender *neck* and a swollen *center*, in which is the ovum (oosphere or egg-cell). Fertilisation takes place by means of spermatozooids which pass down the neck.

Archelaus, King of Macedonia (413-399 BC), obtained the throne by the murder of his uncle, cousin, and half-brother. He ruled wisely, and attempted to inculcate the refinements of Gk civilisation among his subjects.

Archelaus of Cappadocia (1st cent. BC), general of Mithridates the Great. In 87 BC he was sent to Greece with a large army, and was besieged by Sulla and defeated. Later he deserted to the Romans.

Archelaus, son of A. of Cappadocia; King of Egypt. In 56 BC he married Berenice IV. He reigned only 6 months, being defeated and slain by Aulus Gabinus in 55 BC.

Archelaus (d. AD 17), grandson of A., King of Egypt. In 41 or 34 BC he received the kingdom of Cappadocia from Mark Antony, on whose side he fought at Actium. He then deserted to Augustus, by whom his dominions were enlarged. A. d. in captivity at Rome, whither he had been summoned by Tiberius, and Cappadocia was made a Rom. prov.

Archelaus, ruler of Judaea, son of Herod the Great (q.v.). He refused to accept the throne before obtaining the consent of Augustus. His request, though strongly opposed by influential Jews at Rome, was granted by the emperor; but his title was limited to that of ethnarch. A violation of the Mosaic law caused his deposition and banishment.

Archelaus, Bishop of Carrhae in Mesopotamia, had a controversy with the heretic Manes, c. AD 278. He pub. 2 books of the *Acta Disputationis*, etc., in Syriac, later trans. into Greek by Hegemonius. A fragment of this work is preserved by Valesius, in the notes to his *Socrates*, pp. 197, 203, lib. i, c. 22; and in a more complete form by Zaccagnius in his *Collectanea Monumentorum Veterum Ecclesiae Graecae*, 1698 (Fabricius, *Bibliotheca Graeca*).

Archelaus of Miletus (5th cent. BC), b. probably at Athens. He was a pupil of Anaxagoras (q.v.), and Ion of Chios (quoted by Diogenes Laërtius, II. 23) states that he was a teacher of Socrates. A. taught that primary matter combined with mind to produce fire and water, from which sprang animal life. Nothing of his work remains; but his doctrine may

be inferred from the writings of Diogenes Laërtius, Simplicius, Plutarch, and Hippolytus.

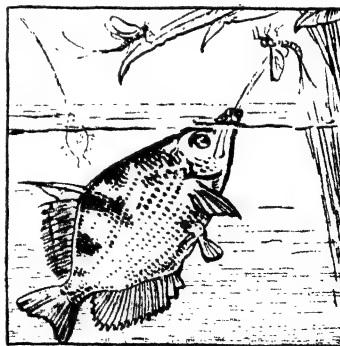
Archer, Frederick (1857-86), jockey, b. Cheltenham. Rode his first race, 1870. Won the Derby 5 times, Oaks 4, St Leger 6, Two Thousand Guineas 5.

Archer, Frederick Scott (1813-57), b. Bishop's Stortford. Inventor of the collodion process in photography and sev. improvements to the camera.

Archer, Thomas (11668-1743), architect, one of the practitioners of Baroque architecture in England; studied abroad after leaving Oxford. Designed Heythrop House, Oxon; the N. front of Chatsworth; and the churches of St Philip, Birmingham (now the cathedral), 1710-25, and St John, Westminster, 1714-28.

Archer, William (1856-1924), dramatic critic, b. Perth, Scotland, son of Thos A., C.M.G., of Queensland. Educ. at Edinburgh Univ. he travelled in Australia, 1876-7; and, after returning to Edinburgh, went to London, where he soon took a prominent position in the literary world. He was dramatic critic on the *World*, 1881, and, later, on the *Tribune* and *Nation*. He did much to popularise Ibsen in England. He trans. (either alone or in collaboration with his brother, Charles Archer) a number of Ibsen's plays, as well as editing Ibsen's prose dramas in 5 vols., 1890-1. His works include *English Dramatists of To-day*, 1882, *Masks or Faces*, 1888, *The Theatrical World*, 1893-7, *Study and Stage*, 1899, *Poets of the Younger Generation*, 1901, *Real Conversations*, 1904, *The Thirteen Days*, 1915, *India and the Future*, 1917, and *The Old Drama and the New*, 1923. His plays include *War is War*, 1919, *The Green Goddess*, 1923, which was a great success, and 3 pub. posthumously: *Mother Washington*, *Beatrice Juana*, and *Lidia*. He d. in London.

Archer, see SAGITTARIUS.



ARCHER-FISH

Archer-fish, *Toxotes*, a spiny-finned fish of the family Toxotidae, found off the Australian and E. Indian coasts. It

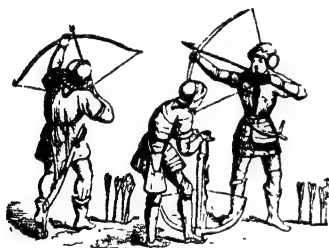
casts a drop of water from its mouth on to an insect playing near the surface of the sea, causing it to fall in, when it is devoured.

Archery, use of the bow and arrow, both for hunting and warfare, is widespread and dates from very early times. The foremost archers of antiquity were the Egyptians, who used bows a little shorter than a man, and arrows headed with bronze or flint, 2 to 3 ft long. On the authority of the Bible and other



ARROW

writers, the Jews were deadly with the bow, which seems with them to have been made of reed, wood, or horn. All Asiatic nations were bowmen, notably the Babylonians, Persians, and Scythians. In medieval times the Arabs and Turks were famous archers, as were the Japanese till recent times. Exploration has revealed the use of the bow among the natives of the E. and W. Indies, S. America, the Arctic circle, and Central Africa. The Germanic nations and the Welsh appear to have been most proficient in A. in early European hist. The Greeks and Romans in anct times, despite the legends of Teucer, Ulysses, etc., seem to have been indifferent archers, and recruited their bowmen from Crete and Asia Minor. After the 4th cent. AD the Rom. armies consisted very largely



ARCHERS AT AGINCOURT

of mounted archers. Scandinavian legend has many references to famous bowmen, and by the 10th cent. the short bow was the chief weapon of the poorest military classes in England, France, and Germany. Both the English and Normans employed mounted archers at Hastings in 1066. The cross-bow, or arbalest, for the shooting of bolts, which was mounted on a stock and discharged by a catch or trigger, was also much in use, especially in sieges and naval battles, though it was condemned by the Lateran Council of 1139. It made its reputation in the crusades, proving much superior to the bow used by the mounted Asiatic archers. In Europe the best exponents

of its use were the Genoese, Pisans, and Venetians. Its use in England was forbidden by Henry VII. The famous English long-bow, at least 6 ft long with a shaft a cloth-yard long, seems to have been introduced from Wales. Its long range and speed were proved at Falkirk in 1298, and the Eng. archers played an important part at Crécy, Poitiers, and Agincourt. A. was supported by all the kings, who encouraged its practice for sport, as is witnessed by the many ballads on the skill of Eng. marksmen. The introduction of gunpowder, which began early in the 15th cent., naturally meant the gradual decay of A., but its disappearance in England was slow. In the reign of Elizabeth treatises on the art were still being written; notably the *Toxophilus* of Roger Ascham, 1545, a detailed and practical work. The long-bow died out at the end of the 16th cent., and the cross-bow early in the 17th. In 1807 horse archers were used in Poland against Napoleon, and in 1860 the Chinese used bows at Taku. In the mid 18th cent. there was a great revival of A. for purposes of health and exercise, which resulted in 1781 in the formation of the Royal Toxophilite Society. Other societies for the practice and encouragement of the art are the Woodmen of Arden, 1785, having H.Q. at Meriden in Warwickshire; John o' Gaunt's Bowmen, 1785; and the Royal Company of Archers (Scotland), dating from 1676. The main legislative and managing body of Brit. A. at the present day is the Grand National A. Society, founded 1861, which holds championship meetings and to which regional and county associations of clubs are affiliated. Best bows were made of yew, but owing to scarcity of that wood (and for greater efficiency) most are now made of steel or combinations of wood and 'plastics.' The length of the bow varies from 5 to 6 ft, according to that of the arrows used (25-30 in.), and it has a drawing power of 40-60 lb. for men, and 24-32 for ladies. The string is made of 3 strands of hemp, dressed with glue, or of flax dressed with wax. The arrow is made of red deal or aluminium alloy and has a 'pile,' or point, a 'nock' for string, and 3 turkey feathers.

Arches, Court of, eccles. court of the Archbishop of Canterbury, so called because it was anciently held at the church of St Mary of the Arches, now St Mary-le-Bow. It has power to deal with suits sent up from the consistorial courts of the provs. of Canterbury. The presiding judge is described in his letters patent as the official principal of the C. of A. of Canterbury, but is usually called the Dean of the A. Since 1874 he has also been chief judge of the chancery court of York.

Archias, A. Licinius, (Gk poet, b. Antioch in Syria 120 BC. Coming to Rome in 102, he was patronised by the Luculli, whose gentile name he assumed, and Cicero was later among his pupils. In 61, while engaged on a poem commemorating Cicero's consulship, A. was charged with having unlawfully assumed Rom. citizenship some 30 years earlier.

He was successfully defended by Cicero in the speech *Pro Archia*, which is our prin. source of information on his career. See also T. Reinach, *De Archia Poeta*, 1890.

Archibald, Raymond Clare (1875-), Amer. mathematician, b. Colchester co., Nova Scotia, and educ. at Mount Allison Univ., Sackville, New Brunswick, Harvard, Berlin, etc. He gained some distinction in violin-playing, but it is as a student of mathematics that he is best known. After occupying a mathematical professorship at Acadia Univ., Nova Scotia, and an instructorship at Brown Univ., he became associate prof. at Brown Univ. 1917-23. Publications: *The Cardoid and Some of its Related Curves*, 1900; *Mathematical Instruction in France, 1910*; *Bibliography of Life and Works of Simon Newcomb*, 1905, 1924; *Euclid's Book on Divisions of Figures with a Restoration*, 1915; *Bibliography of Egyptian and Babylonian Mathematics*, 1927-9; and numerous contributions to European and Amer. journals and reviews.

Archidamus, name of 5 kings of Sparta from the 7th to the end of the 3rd cent. bc. The most famous was A. II (q.v.).

Archidamus II, son of Zeuxidamus, became king when his grandfather, Leotychides, was banished from Sparta. A. reigned from 469 to 427 bc. Prudence and foresight, steadiness of purpose and gravity of deportment were his prominent qualities. In the fourth year of his reign Sparta was nearly annihilated by an earthquake, an opportunity of which the Messenians took advantage to attempt the recovery of their independence. A., by his presence of mind, saved what remained of the city from the hands of an exasperated foe; but it was not till the end of 10 years that this third Messenian war was brought to a close, when the Messenians evacuated their citadel, Ithome (Diod. Sic. xi. 64; Thucyd. i. 103). A. is not mentioned again till we find him speaking on the peace side in the council held by the Lacedaemonians before they resolved on the Peloponnesian war. Though a declaration of war was the result of their deliberation (431 bc), the Lacedaemonians gave him the command of the troops against the Athenians. He was their general also in their second expedition (426 bc) and third expedition (428 bc). He was succeeded by his son, Agis II (Thucyd. i. 79; ii. 10-20, 71; iii. 1).

Archidamus III (d. 338 bc), son of Agasilaus, succeeded his father 361 bc. He commanded the Spartan troops during his father's lifetime, 367 bc, and gained the 'tearless battle' against the Arcadians and Argolians: not one of the Spartans fell, but a great many of the enemy were slaughtered. He was sent (338 bc) to Italy to assist the inhab. of Tarentum, who were at war with the Lucanians. He fell bravely at the head of his troops, and a statue was erected to his honour at Olympia by his countrymen. He was succeeded by his son, Agis III (Diodorus Sic. xvi. 24, 63; Pausanias, iii. 10).

Archidamus IV, grandson of A. III, King of Sparta in 294 bc.

Archidamus V, grandson of A. IV, King of Sparta in 240 bc.

Archidoria, see DORIS.

Archigenes of Apamea (fl. AD 98-117) was a medical author and practitioner at Rome during the reign of the Emperor Trajan (see Juvenal, *Satires*, vi. 236; xiii. 98; xiv. 252). He followed the principles of the Pneumatic sect, founded by Athenaeus of Attalia, and wrote treatises on pathology and the practice of medicine and surgery. His fragments are in the works of Galen, Aetius, and Oribasius.

Archil, or **Orechil**, violet dye which is obtained from sev. species of lichens, notably from the *Roccella tinctoria*. As materials dyed solely with it fade readily in the sunlight, another dye is usually employed at first and the A. is used to give an added brilliance.

Archilochus (early 7th cent. bc), Gk lyric poet, b. Paros, which he left to join the colony of Thasos. Killed in battle between the Parians and Naxians. He enjoyed a very high repute among the ancients, especially for his iambic satiric poems. A. was the first writer in the metre which was afterwards that of Gk drama. For the few surviving fragments of his work see E. Diehl, *Anthologia Lyrica Graeca*, 1949.

Archimagus, or the Anglicised form **Archmage**, was used to denote a chief magician, a mighty worker of things 'mystic, wonderful.' In Spenser's *Faerie Queene* it is applied to the personification of hypocrisy.

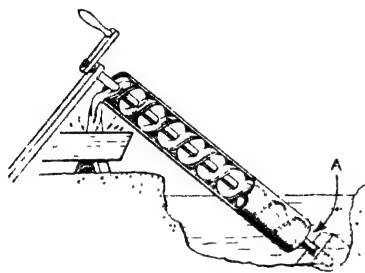
Archimandrite, title of the highest order of monastic superiors in the Oriental Church, almost corresponding to that of abbot in the Lat. Church. Russian bishops are chosen from the A.s.

Archimedes (287-212 bc), Gk mathematician and engineer, b. Syracuse in Sicily. His mathematical studies were chiefly concerned with the relation of spherical and rectilinear surfaces and bodies. But he is most famous for his discoveries in hydrostatics and mechanics. He estab. the principles of the lever, and of the equilibrium between a floating body and the hydrostatic pressure of the liquid in which it floats. According to tradition, A. was invited by Hieron II to determine whether a golden crown made for him did not in fact contain a proportion of silver. A. was at a loss to decide the question until one day, as he stepped into a bath, he noticed the water running over. He then realised that the excess of bulk caused by the presence of alloy could be measured by putting the crown and equal weights of gold and silver separately into a vessel of water, and noting the differences of overflow. Whereupon he ran home naked, shouting: 'Heureka! heureka!' (I have found it, I have found it.)

A. also invented a number of military engines which postponed the fall of Syracuse, and was killed when the city was taken by the Romans. Amongst his extant works on three-dimensional geometry are *The Sphere and the Cylinder*

Conoids and Spheroids, and Semi-regular Polyhedrons. Other works are his *Mechanics, Levers, Floating Bodies, and the Method* (discovered in 1906). The definitive text of A.'s writings is that of J. L. Heiberg (2nd ed. 1910-15). Sir T. Heath ed. *The Works of Archimedes* in modern notation (1897), and also, as a supplement, the *Method* (1912). See Sir T. Heath, *Archimedes*, 1920, and *History of Greek Mathematics*, vol. II, 1921.

Archimedes' Screw, machine for raising water. It may consist of a tube wound spirally round a cylindrical axis or a cylinder enclosing a screw so as to form a spiral chamber from end to end. The lowest portion of the screw just dips into the water, and as the cylinder is turned a small quantity of water is scooped up.



ARCHIMIDES' SCREW

A, Opening for entry of water.

The inclination of the cylinder is such that at the next revolution the water is raised above the next thread, whilst the lowest thread scoops up another quantity. The successive revolutions, therefore, raise the water thread by thread to emerge at the top of the cylinder. The machine is used in Holland for draining purposes, and the same principle is sometimes used for raising grain to a higher level in a continuous stream.

Archinto, name of a celebrated family of Milan whose prin. members were:

1. Filippo (1500-58), Bishop of Saluzzo, theologian and diplomatist.
2. Count Filippo A., b. 1649, Governor of Cremona 1692-4.
3. Giuseppe A. (1649-1712), Cardinal and Archbishop of Milan.
4. Carlo A. (1669-1732), son of Giuseppe A. He pub. Muratori's *Scriptores rerum Italicarum*, and founded the Palatine Society.

Archinus, an Athenian who lived during the latter part of the 5th and the beginning of the 4th cent. BC, was the companion of Thrasylbulus. He helped to overthrow the 30 tyrants of Athens, and was mainly instrumental in bringing about the famous amnesty when the democracy was restored in 403. It was owing to him that public documents were written in Ionian instead of in Attic characters.

Archipelago, Gk term (= chief sea)

originally applied to the Aegean Sea, and now to any sea thickly scattered with is.

Architect (from Gk *architekton*, chief craftsman; hence Lat. *architectus*), in modern practice a person qualified to design buildings and to supervise their erection. In Gk and Rom. times his status was fully recognised, and an A.'s duties are fully described by Vitruvius (q.v.). The title was seldom used during the Middle Ages, the A. then being commonly called 'Master' in English (or *magister* in Latin, *maitre* in French, *maestro* in Italian and Spanish, *Baumeister* in German). The Victorian idea that most medieval buildings were designed by monks and bishops rather than by lay A.s has long ago been disproved by many competent authorities, documents having established the fact that the services of lay-designers were utilised by ecclesiastical as well as royal and lay employers.

The title A. was revived during the 16th cent. and was used by Inigo Jones (q.v.) in the early 17th cent. The status of the A. became more definite during the 17th-18th cents.; and in 1834 the foundation of the Royal Institute of Brit. Architects estab. a precise standard of qualification. This Institute, which has its H.Q. at 66 Portland Place, London, conducts examinations for candidates from Britain and overseas, and awards diplomas: F.R.I.B.A., A.R.I.B.A., L.R.I.B.A. In 1925 it absorbed the Society of Architects. The Architectural Association was founded in London in 1847 to provide facilities for social intercourse among A.s and for the education of the younger men; it conducts a large architectural school in Bedford Square.

Since the enactment of the Architects' Registration Act (1938) architectural practice in Britain has been restricted to persons qualified and registered, as in certain other countries abroad. In the U.S.A. the premier architectural body is the Amer. Institute of Architects, with headquarters in Washington. See M. S. Briggs, *The Architect in History*, 1927.

Architecture. *Definition.* The word 'architecture' was first used c. 1563, so is not very old as Eng. words go; but is derived from Lat. *architectura*, and that in turn from Gk *architekton*, literally 'chief craftsman' or 'master-builder.' Hence A. means building designed by a competent person (see ARCHITECT) as distinct from building not so designed. This is not a very clear distinction, and is so difficult to explain that most of the attempts made for three or four cents. past are all unsatisfactory. An Eng. writer in 1581 defined A. as 'the science of building'; Ruskin in the 19th cent. wrote that it is 'nothing but ornament applied to buildings,' a dictum that is universally rejected to-day, when many stark and austere buildings devoid of ornament are accepted as excellent A. It is something more than 'good building' in the sense of sound construction with good materials. An often quoted definition by Sir Henry Wotton, an amateur

critic, in his book, *The Elements of Architecture*, 1624, comes very near the truth. He says that it must fulfil three conditions, 'Commoditie, Firminesse, and Delight,' meaning that, to constitute A., a building must not only be conveniently planned for its purpose ('commodity'), and be soundly built of good materials ('firmness'), but must also give pleasure to the eye of a discriminating beholder ('delight'). It is this third quality, added to the other two essentials, that differentiates 'architecture' from mere 'building.'

Some very primitive buildings, such as rude huts or wigwags in all ages, cannot be counted as A.; and to these may be added primitive stone circles (such as Stonehenge), megaliths, and barrows; also, perhaps, the Egyptian pyramids, and, in modern times, bridges and other structures which are now commonly regarded as 'civil engineering' rather than A. or even building.

Bibliography. GENERAL: J. Ruskin, *The Seven Lamps of Architecture*, 1849; R. Sturges, *Dictionary of Architecture* (3 vols.), 1901-2; H. M. Robertson, *Principles of Architectural Composition*, 1924, and *Architecture Explained*, 1926; A. S. G. Butler, *The Substance of Architecture*, 1926; T. D. Atkinson, *A Glossary of Architecture* (4th ed.), 1928. GENERAL HISTORY OF ARCHITECTURE (for hist. of special periods and of the A. of individual countries—e.g. AMERICAN ARCHITECTURE, ENGLISH ARCHITECTURE—see bibliographies at end of articles on each): J. F. Durm (ed.), *Handbuch der Architektur*, 1885 onwards; J. Fergusson, *History of Architecture* (5 vols.), 1891-3; A. Choisy, *Histoire de l'Architecture* (2 vols.), 1899; F. M. Simpson, *History of Architectural Development* (3 vols.), 1905-11; T. G. Jackson, *Architecture*, 1925; A. L. N. Russell, *Architecture*, 1927; A. D. F. Hamlin, *History of Architecture*, 1928; A. E. Richardson and H. O. Corbato, *The Art of Architecture*, 1938; N. Pevsner, *Outline of European Architecture*, 1942; M. S. Briggs, *Architecture*, 1947; H. H. Statham, *A Short Critical History of Architecture* (3rd ed.), 1950; P. L. Waterhouse and R. A. Cordingley, *The Story of Architecture* (3rd ed.), 1950; B. F. Fletcher, *History of Architecture* (16th ed.), 1954.

Periods

The following paragraphs describe the various 'periods' or stages in the hist. of A. up to modern times, but are concerned with general world development. For the distinctive characteristics of each important country, with its buildings and the names of their architects where known, see the various articles on each, e.g. ENGLISH, FRENCH, RUSSIAN ARCHITECTURE.

1. *Pre-Classical Architecture*, up to c. 700 BC (i.e. older than the classical or Hellenic A. of Greece, the first classical period in Europe). Before 700 BC buildings of some pretensions had been erected in W. Asia—including Mesopotamia, Persia, and parts of India—and in Egypt, Greece, and the Aegean Is.

(1a) In *Ancient Egypt*, because life on earth was regarded as no more than a

preliminary to the future life, dwelling-houses of all classes were constructed of relatively impermanent materials, and hardly any have survived to-day; whereas temples and tombs were built to last, as indeed they have done, for thousands of years. In the limited space here available, only temples can be mentioned, though it may be remarked that the numerous and imposing pyramids (q.v.) had their origin in a primitive form of tomb called a *mastaba* (q.v.). *Ancient Egyptian A.* dates from at least 4000 BC to c. 30 BC, when Egypt became a Rom. prov. (See EGYPTIAN ARCHITECTURE; after 7th cent. AD, see MUSLIM ARCHITECTURE.) Although Egypt was occupied for cents. by Assyrians, Persians, and Greeks before its conquest by the Romans, its A. retained distinctive national features throughout. The temples were mostly built of granite (see also OBELISK), with walls which were 'battered' (i.e. tapered slightly as they rose), squat and clumsy columns, and flat roofs. Arches were hardly ever used, though the principle of the arch was known. The chief temples in Egypt are the temple of the Sphinx at Giza, at least fourth millennium BC; the group of temples at Karnak, c. 2466 BC onwards; and the single temples at Abydos, 1350-1330 BC; Abu Simbel, 1330 BC; Edfu, 237 BC; Philae; and Dendera. See E. Bell, *The Architecture of Ancient Egypt*, 1915; Sir W. F. Petrie, *Egyptian Architecture*, 1938; H. Plummer, *Ancient and Classical Architecture*, 1956.

(1b) In *W. Asia* the hist. of early A. is complicated by changes of dynasty (see BABYLONIA, ASSYRIA, PERSIA). The 3 stages are generally described as Babylonian (c. 2630-1275 BC), Assyrian (1275-538 BC), and Persian (538-331 BC). From the 7th cent. AD all these countries of the Middle E., as well as the neighbouring portions of Asia Minor previously forming the Hittite Empire (q.v.), were occupied by the Muslim Arabs (see MUSLIM ARCHITECTURE).

The large walled city of Babylon (q.v.), which became the cap. c. 2000 BC, contained many fine palaces of brick, faced with glazed bricks; also numerous temples; but hardly anything now survives. The chief buildings of the Assyrian era were huge palaces in diminishing stages. Arches, but not columns, were used in these buildings. The chief palaces, now all in ruins, are at Nimrud, 9th cent. BC; Khorsabad, 722-705 BC; and Nineveh, 7th cent. BC. In the Persian period, and therefore contemporary with classical Gk A., the chief surviving buildings are the ruined palaces of Cyrus at Pasargadae, of Darius and Xerxes at Persepolis, of Xerxes and Artaxerxes at Susa. They had flat roofs of timber, carried on tall slender stone columns. See E. Bell, *Early Architecture in Western Asia*, 1921, and Plummer, op. cit., 1956.

(1c) In the *Aegean* (including Crete and parts of Greece) there was an advanced civilisation long before the classical or Hellenic period began c. 700 BC. It is commonly described as the *Aegean*

period, and includes the famous Palace of Minos at Knossos in Crete (q.v.) as well as the important fortified palaces at Tiryns (q.v.) and Mycenae (q.v.) on the mainland. Although there is evidence of civilisation in the Aegean area as early as 3000 BC, the first palaces at Knossos and Phaestos in Crete were built c. 2000 BC, and restored or rebuilt after damage by earthquake and fire a few cents. later. About 1400 BC Mycenae, which had long been prosperous and strong, attacked Crete and became the chief power in the Aegean, until the Dorians invaded Greece from the N. c. 1100–1000 BC. It is impossible to assign accurate dates for the palaces at Knossos, Mycenae, and Tiryns; for in each case their construction lasted over cents., and at Knossos perhaps a thousand years. There the chief interest lies in the impressive sequence of rooms and staircases, the elaborate drainage system, and the coloured mural decorations. At Mycenae the fortified palace contains the wonderful domed tomb, 50 ft in diameter, commonly but incorrectly called the 'Treasury of Atreus' (c. 1185 BC), and the 'Lion Gate' (c. 1200 BC). Here, as in the colossal walls of Tiryns, the huge blocks of 'cyclopean' masonry are astounding. It is now confirmed that there was frequent contact between these 'sea people' of the Aegean and the ancient Egyptians. See E. Bell, *Pre-Hellenic Architecture of the Aegean*, 1926, and J. D. S. Pendlebury, *A Handbook to the Palace of Minos, Knossos*, 1955.

2. *Greece*. Classical or Hellenic GK A. began c. 700 BC, and lasted until the Rom. occupation of Greece in 146 BC; but its later stages, from the death of Alexander the Great in 323 BC until 146 BC, are now generally described as 'Hellenistic' or 'Graeco-Roman.' The so-called 'Golden Age' of Greece occurred in the 5th cent. BC, and all the finest buildings were erected between 480 BC and 323 BC. These buildings comprised temples, theatres, sepulchral and other monuments, formal colonnades (*stoa*), and dwelling-houses, but hardly any palaces. Theatres and houses are dealt with under those headings, leaving temples as the chief buildings to be described here.

GK temples are classified in sev. different ways: (i) according to the type of column or 'order' used (see *ORDERS OF ARCHITECTURE*). There were three orders—Doric, Ionic, and Corinthian—of which the third was seldom used in Greece; (ii) according to the number of columns in a row at the end of the temple, i.e. distyle (2), tetrastyle (4), hexastyle (6), octastyle (8), occasionally nonastyle (9), and decastyle (10 columns); (iii) according to the arrangements of columns around the buildings: peripteral if one range of columns, dipteral if two ranges, and a few other variations. The temples varied greatly in size, from a very small one at Rhamnus measuring only 21 by 35 ft overall, to the temple of Apollo at Miletos measuring 388 by 194 ft, including its surrounding columns and platform. At Epidauros is an unusual circular

temple or *tholos*. Whatever the arrangement of surrounding columns, the temple proper included a chamber or shrine (*naos*) containing a statue of the god or goddess to whom it was dedicated; and usually a *posticum* or *epinaos* (often serving as the *opisthodomos* or treasury) behind the *naos*, and a portico or *pronaos* in front of it. There were no windows in the walls, and it is unknown whether, in any temple, light was admitted through transparent tiles in the roofs. These roofs were low in pitch, made of timber, and covered with tiles of clay or marble. The walls, columns, and lintels were either of the beautiful Pentelic or other marbles easily obtainable in Greece, or of limestone or sandstone; but the design of these stone buildings is derived from much earlier buildings of timber-framing.

Especially in the Parthenon (q.v.) at Athens—the most beautiful and highly finished temple of all—great ingenuity was shown in correcting optical illusions by means of subtle refinements, e.g. in providing a delicate convex curvature (*entasis*) to the tapered columns so that their tapering should not appear concave, and a similar subtle curvature to the platform of steps upon which the columns rested. Besides the numerous temples in Greece itself, there were many others in Sicily and S. Italy, where the various GK colonies were collectively known as *Magna Graecia*. These are mentioned in the article *ITALIAN ARCHITECTURE*. Following are the prin. temples in Greece and Asia Minor, with their dates:

Doric

Olympia, the Heraion	c. 640 BC
Eleusis, Temple of the Mysteries	7th–6th cents. BC
Corinth, Temple of Apollo	c. 625 BC
Rhamnus, Temple of Themis	c. 510 BC
Aegina, Temple of Aphaia	c. 490 BC
Olympia, Temple of Zeus	c. 460 BC
Delos, Temple of Apollo	c. 450 BC
Athens, the Parthenon	447–432 BC
Athens, the Thesion	c. 428 BC
Sunium, Temple of Poseidon	c. 425 BC
Bassae, Temple of Apollo	
Epauris	c. 420 BC
Epidauros, the Tholos	360–330 BC
(¹ Also Ionic and Corinthian)	

Ionic

Ephesus, older Temple of Artemis	c. 560 BC
Samos, Temple of Hera	c. 500 BC
Athens, Temple on the Ilissus	c. 450 BC
Athens, Temple of Nike	
Apteros	c. 425 BC
Athens, the Erechtheion	? 421 BC
Ephesus, later Temple of Artemis	c. 356 BC
Priene, Temple of Athena	
Polias	c. 335 BC
Miletus, Temple of Apollo	
Didymaeus	c. 330 BC

Corinthian

Athens, the Olympieion	c. 170 BC
------------------------	-----------

Besides temples, mention must be made of the prin. theatres, especially that at

Epidauros (c. 330 BC) and the theatre of Dionysos at Athens (c. 340 BC); of the enormous stadium at Athens, holding 70,000 persons and in 1896 restored from ruin to its former grandeur; of the Propylaea or formal entrance gateway to the Acropolis at Athens (437-432 BC); of the dainty little monument of Lysikrates (335 BC) and the Tower of the Winds (c. 50 BC), both in Athens; and also of the magnificent Stoa of Attalus (c. 150 BC), recently restored, in Athens.

(For the names and works of Gk architects see CALLICRATES; DINOGRATES; ICTINUS; MNEKLES.) During the Middle Ages and until the early 19th cent. the only notable buildings erected in Greece were Byzantine churches and monasteries in and around Athens, and at Daphni, Mistra, and Stiris (see '4' below). See E. Bell, *Hellenic Architecture*, 1920; D. S. Robertson, *Greek and Roman Architecture*, 1929; W. B. Dinsmoor, *The Architecture of Ancient Greece* (3rd ed.), 1950; H. Mommer, *Ancient and Classical Architecture*, 1956.

3. *Etruscan and Roman*. The earliest It. A. is commonly called 'Etruscan' after the Etruscan tribes which occupied the dist. of Etruria, approximately between the rivs. Arno and Tiber on the SW. side of the Apennines and between the cities of Rome and Florence. The fragmentary remains of Etruscan A. are, however, distributed over a wider area extending N. of the Arno; and their dates are uncertain. Although the Etruscans may have entered Italy as early as 1000 BC, possibly from Asia Minor, most of their scanty A. must be attributed to a much later date, and the end of the Etruscan period in A. is generally dated at c. 100 BC, centuries after the legendary but probable foundation of Rome in 753 BC. 'Etruscan A. is therefore synonymous with 'early Rom.' or 'early It. A. (see ITALIAN ARCHITECTURE).

As remarked above, Gk colonies were estab. around the coasts of Sicily and S. Italy during the 8th-6th cents. BC, and the influence of Greece is very apparent in Etruscan buildings. The invention of the arch, once ascribed to the Etruscans, is now known to be much older than any Etruscan examples yet discovered. Some of the early tombs, hewn out of solid rock, represent the interiors of timber houses; and from these it is possible to infer the appearance and construction of Etruscan dwellings (e.g. in a tomb at Corneto), while in another tomb at Cerveteri there is a primitive representation of the Gk Doric Order.

It is only in their temples that the Etruscans seem to have reached any tolerable standard of A., but even of these no examples survive. In some respects they resembled Gk Doric temples, but they were usually square on plan, and were mainly constructed of wooden posts, beams, and rafters, covered with elaborate but crude casings of terra-cotta. From surviving portions of these casings, and the descriptions in the books of Vitruvius (q.v.), it has been possible to reconstruct, full-size, an Etruscan temple of the 3rd

cent. BC, formerly at Alatri and now in the garden of the Etruscan Museum in the Villa Giulia, Rome, which also contains an anct terra-cotta model of the temple at Lanuvium, 5th cent. BC. The Alatri temple is square, with a portico of only two columns at each end, richly modelled terra-cotta friezes and cornices, no windows, and a pedimented roof of low pitch. The columns are a rustic form of Doric, without flutings: the type which Vitruvius christened the 'Tuscan Order.'

The transition from 'Etruscan' to 'Roman' A. is imperceptible, but may be dated at c. 100 BC, by which time Greece had become a Rom. prov. (146 BC). Thus Rom. A. is largely a product of the Gk tradition, grafted on to a native Etruscan tradition which was itself mainly Gk; but, in the vigorous hands of later Romans, a distinctive Rom. style of A. was created, and soon it spread all over the empire.

In contrast with the 'trabeated' A. of the Greeks (Lat. *trabs*, a beam), where all the weight of a building was carried over openings by lintels or horizontal beams, the Romans, from the outset, favoured 'arcuated' construction, where arches took the place of beams over openings whenever possible. The Romans, however, did not entirely discard the Gk 'orders'—consisting of standardised columns supporting a standard arrangement of beams (the 'entablature')—but used them mainly as ornamental rather than structural features, e.g. not only in imposing porticos at the entrance to temples, but even as unnecessary surface decorations on the exterior or interior of buildings. A notable example is the Colosseum at Rome, where the vast structure consists of tiers of massive arches, to which the tiers of added orders give no additional strength. Though the Romans used all three Gk orders—Doric, Ionic, and Corinthian—in modified form, they favoured the richest of all, the Corinthian, which had been least popular with the Greeks.

Arches were invariably semicircular, whether of stone or of brick. Much daring, novel, and imposing construction was effected by the use of concrete, of which pozzolana (a volcanic ash) was an important ingredient. With this new material great vaults and domes were erected; but travertine stone was also largely used in Rome, and marble was imported in later years for the prin. public buildings. A unique and comprehensive account of Rom. architectural design and construction in the early years of the empire is given by Vitruvius (q.v.).

Besides erecting temples, theatres, and certain other types of building already developed by the Greeks, the Romans introduced many new types: e.g. amphitheatres (q.v.), public bathing establs. (*thermae* (q.v.)), basilicas (q.v.), apartment houses or 'flats,' especially in Rome and Ostia (see HOUSE), enormous palaces for the emperors (especially on the Palatine in Rome and at Spalato in Dalmatia), triumphal arches, and—in later years—Christian churches.

No less than 400 temples are said to have existed in Rome itself in the 4th cent. AD, when the pop. is computed to have reached a million. Some of them were surrounded by a peristyle of free-standing columns, as in Gk temples. Some others had the surrounding columns partly built into the side-walls (as at the *Maison Carrée* at Nîmes). The prin. examples in the city of Rome are the temples of Fortuna Virilis (c. 40 BC); Mars Ultor (2 BC); Concord (7 BC-AD 10); Castor and Pollux (AD 6); Vespasian (c. AD 80); Venus and Rome (AD 135); Antoninus and Faustina (AD 141); and Saturn (c. AD 320). In Rome are also the circular temples of Vesta (AD 205)

mausoleum of Augustus (c. 25 BC, 270 ft diameter) is in a ruinous condition.

The secular basilicas are described elsewhere (see *BASILICA*); and the basilican churches, erected after Constantine granted toleration to Christianity in AD 313, are dealt with below.

All the buildings mentioned (except the temple of Tivoli) are in Rome itself, and were erected before Constantine's removal of the cap. of the Rom. Empire to Byzantium (Constantinople, now Istanbul) in AD 324. For Rom. buildings elsewhere see *ENGLISH*, *FRENCH*, *GERMAN*, *ITALIAN*, *SPANISH ARCHITECTURE*; also *ATHENS*; *BAALBEK*; *PALMYRA*; *TEMPLE (at Jerusalem)*; *TIMGAD*. For



ST CLEMENT'S, ROME

Anderson

and the huge Pantheon (27 BC-AD 124). At Tivoli, near Rome, is the circular temple of Vesta (c. 80 BC).

The enormous *thermae* or bathing estab. served as popular clubs or recreation centres, including gymnasia and libraries as well as baths. The chief examples, all in Rome itself, are the baths of Caracalla (AD 212-35) and Diocletian (AD 302). The only anct theatre in Rome is that of Marcellus (23-13 BC); and the only amphitheatre is the magnificent Colosseum or Flavian Amphitheatre (AD 70-82), which had seating accommodation for 80,000 spectators. Of seven great circuses in the city none remain; but the site of the Circus Maximus is open, and enables one to realise the vast size of a building that held 250,000 persons. The surviving triumphal arches in Rome are those of Titus, AD 82; Septimius Severus, AD 203; and Constantine, c. AD 315. Trajan's famous column was erected in AD 112. The best preserved tombs are the great circular mausolea of Hadrian (c. AD 135, 240 ft diameter, now called the 'Castle of S. Angelo'); and of Caecilia Metella (c. 20 BC, 94 ft diameter); but the

Rom. architects see *APOLLODORUS*; *ARCHITECT*; *VITRUVIUS*. See W. J. Anderson, R. P. Spiers, T. Ashby, *Architecture of Ancient Rome*, 1927; D. S. Robertson, *Greek and Roman Architecture*, 1929; H. Plommer, *Ancient and Classical Architecture*, 1956.

4. *Early Christian and Byzantine*. Although the Rom. Empire maintained some sort of an existence long after Constantine transferred the cap. from Rome to Byzantium in AD 324, that date really marks the end of Rom. A. Constantine having officially recognised Christianity by the Edict of Milan in 313, a number of basilican churches were erected—mainly in Rome—between c. 330 and 340; and very little other building took place in the city. It is for that reason that the name 'Early Christian' is given to the period from c. 330 to the estab. of the Lombard kingdom of Italy in 568. Then the 'Lombard style' of A. was created, afterwards becoming the first phase of 'Romanesque' A.

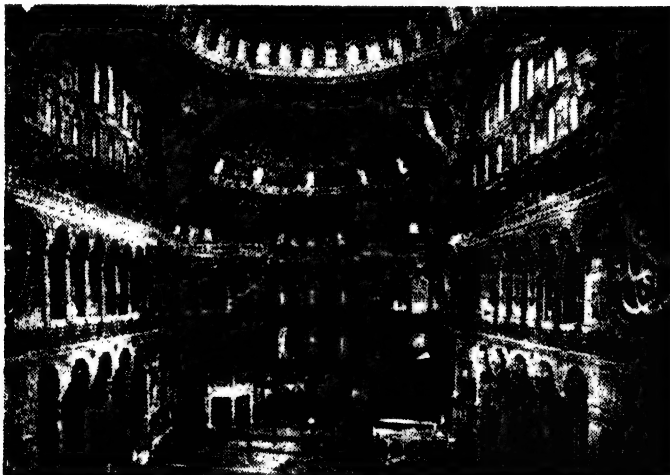
The reason why no notable churches older than Constantine's day survive is that the first Christians had to worship in secret because of persecution. Their meetings

were held either in private houses or in catacombs (q.v.) outside Rome.

The basilican churches founded in and around Rome in Constantine's day and shortly afterwards include some of the most famous shrines of W. Christendom. Among sev. which have been entirely rebuilt was the great original basilica of St. Peter's, 330. Most of the others have been much altered; so that the typical example of Early Christian A. in Rome is now St. Paul's-without-the-Walls, destroyed by fire in 1823 and then completely rebuilt in its original form. Most of these churches are mentioned

examples of Early Christian churches in England, France, and Spain are mentioned in the articles ENGLISH, FRENCH, SPANISH ARCHITECTURE.

Ravenna possesses two interesting basilicas of rather later date than most of those in Rome: S. Apollinare Nuovo, 493-525, and S. Apollinare in Classe, 534-9; both containing fine mosaics and both erected by Theodoric, the Gothic king of Italy. At the same time were erected, by Justinian the Byzantine emperor, the remarkable group of churches which are the chief masterpieces of the Byzantine style. The largest and most



W. F. Mansell

BYZANTINE: INTERIOR OF ST SOPHIA, CONSTANTINOPLE

under ITALIAN ARCHITECTURE (q.v.). They usually comprise an aisled nave, separated from each of its flanking aisles by a row of columns, generally Corinthian and often rifled from older buildings; round-headed windows in the wall above them, to light the interior; an apse at the E. end; and a narthex or vestibule at the W. end (*see* CHURCH). Thus, except for the general plan, they present no new structural or architectural features; but the plan is important, for it was the ancestor of the great medieval churches all over Europe. Abreast of these basilican churches some round churches were also erected: in Rome S. Costanza, 330; the Baptistery of Constantine, 430-440; S. Stefano Rotondo, c. 470; and, at Nocera, the Baptistery, 350.

Meanwhile Constantinople had built some churches in his new cap. at Byzantium ('Constantinople'), one of which was S. Sophia, destined to be rebuilt on a grand scale two cents. later; also the Church of the Nativity at Bethlehem, 330, on the basilican plan. The few

famous is St Sophia at Constantinople which he rebuilt in 532-7. It was designed by Anthemius of Tralles (q.v.) and Isidorus of Miletus (q.v.); and became a mosque after Constantinople was captured by the Turks in 1453, when the tall minarets were added (*see* MUSLIM ARCHITECTURE). In the same city are the domed Byzantine churches of St Sergius and St Bacchus, 527; St Irene, 740; St Saviour-in-the-Chora, c. 1050; and St Theodore, c. 1100. At Ravenna Justinian built the small but wonderful octagonal domed church of St Vitale, 526-47. Much later is St Mark's at Venice, 1042-71, which as seen from the W. side appears Gothic rather than Byzantine, because of florid later additions, but internally is a noble example of Byzantine domed roofing, clothed with rich mosaics. Not far from Venice are the beautiful cathedrals at Parenzo in Istria (535-43) and Grado in Venetia (571-86), but these are mainly basilican in form.

The Byzantine style was adopted

throughout the countries of E. Europe and the Near E., whose religion was ruled by the Orthodox or Gk Church; so that Byzantine churches are found in Greece and Syria, and Byzantine domes spread into Russia (see RUSSIAN ARCHITECTURE). In Greece there are sev. tiny but interesting domed Byzantine churches of the 9th-13th cents. at Athens; and larger examples at Daphni, Mistra, Salonica, and Stiris.

The outstanding feature of Byzantine A. in all its phases is the prominence given to the dome in contrast to the simple sloping wooden roof of the Early Christian

was placed a new feature, the 'dosseret' (q.v.), a block from which rose the arches, which, as in Rom. work, were always semicircular. Columns, usually of marble, were strengthened against earthquakes by bronze annulets. See C. Diehl, *Manuel d'art Byzantin*, 1910; O. M. Dalton, *Byzantine Art*, 1911, and *East Christian Art*, 1926; T. G. Jackson, *Byzantine and Romanesque Architecture* (2 vols.), 1920; J. A. Hamilton, *Byzantine Architecture*, 2nd ed., 1956.

5. *Romanesque*. The term 'Romanesque' has been applied for more than a cent. to the style of A. which, in most



W. F. Mansell

ENGLISH ROMANESQUE: THE GALILEE CHAPEL, DURHAM CATHEDRAL

basilica. At St Sophia, Constantinople, the great central dome is buttressed by semi-domes. The dome was used, in Rom. A., on circular buildings; but Byzantine domes generally rise from square bases, the transition from square to circle being effected by means of 'pendentives' (see DOME, PENDENTIVE). Hence the typical plan of a Byzantine or 'Gk Orthodox' church is a 'Gk cross,' i.e. a central (domed) space with four short arms; whereas the typical plan of a large Rom. Catholic church is a 'Lat. cross,' i.e. a long nave with shorter arms for the chancel and the two transepts, arising from the plan of the Early Christian basilica, with transepts added. Brickwork and concrete were the materials chiefly used, covered internally with mosaics. The Rom. Corinthian capital was modified into a convex shape, and the foliage carved on it was either 'wind-blown' in character or was decorated with new forms of ornament. Above it

European countries, followed the collapse of the auct Rom. Empire and preceded the introduction of the Gothic style, c. 1200. Nowadays it is held to include the so-called 'Lombardic' and 'Rhenish' styles as well as the familiar labels of 'Saxon' and 'Norman' applied to Eng. Romanesque buildings (see ENGLISH ARCHITECTURE). It is important to define its historical and geographical limits. These were not confined to 'Romanised Europe,' as one famous dictionary asserts, for one finds a few Romanesque buildings in Scandinavia (see SCANDINAVIAN ARCHITECTURE) and Poland, which were never Romanised; whereas in SE. Europe, which was Romanised, the Byzantine style was followed (see BYZANTINE ARCHITECTURE).

It is more correct to state that Romanesque was used in the countries of Europe where the Rom. Catholic Church prevailed, while Byzantine was adopted in countries where the Orthodox or Gk

Church was supreme. The latter group included modern Turkey (in part), Greece, Bulgaria, Rumania, and Russia. The Catholic countries included all W. and central Europe, Scandinavia, Hungary, and Poland; but the S. part of Spain, as well as much of Turkey, was under Muslim rule for most of the Romanesque period (see MUSLIM ARCHITECTURE).

A description of the prin. Romanesque buildings and their distinctive national characteristics will be found under the



Anderson

MUSLIM ARCHITECTURE:
THE ALHAMBRA, GRANADA

articles on the A. of the various countries concerned (see BELGIAN, ENGLISH, FRENCH, GERMAN, IRISH, ITALIAN, SCANDINAVIAN, SCOTTISH, SPANISH ARCHITECTURE); and here it is only necessary to describe the general characteristics of the style.

While it is true that all Romanesque A. is a natural development from anct Rom. or classical A., there was a period, commonly called the 'Dark Ages'—between the collapse of the Rom. Empire in the 5th cent. and the reign of Charlemagne in the 9th—when a form of Rom. A. still persisted but when Romanesque had hardly matured. In Italy this was the 'Early Christian' period (see 4); in England and France there are a few churches which could be similarly classified; in Spain there was a 'Visigothic' style (see SPANISH ARCHITECTURE). The oldest buildings that can properly be called Romanesque are found in Italy:

e.g. St Pietro, Toscanella; St Maria in Cosmedin, and St Giorgio in Velabro, both in Rome; parts of St Ambrogio, Milan; and Torcello Cathedral. All these are of the 8th–9th cents., and have been called 'Lombardic' because Lombard kings ruled Italy from 568 to 774, their cap. being at Milan. Charlemagne became Holy Rom. Emperor in 800; and his cathedral (796–804) at Aachen in Germany is the first important Romanesque building in N. Europe. Thus the historical limits of Romanesque A. may be set from c. 800 to the beginning of Gothic A. c. 1200.

This period of four cents. was the great age of European monasticism. The Benedictine Order was founded in Italy in the 6th cent., but its chief buildings were of later date and of Romanesque character. During the period 900–1100 the Benedictines were followed in due course by the Cluniac, Cistercian, Augustinian, Premonstratensian, and Carthusian Orders (see MONASTERY). The 11th and 12th cents. also saw great activity in castle-building, and the science of military A. developed rapidly as the result of warlike contacts with the 'Saracens' during the Crusades (see CASTLE). The architectural work of the Romanesque period therefore consists almost exclusively of monasteries, cathedrals, parish churches, and castles. Very few domestic buildings have survived, for there was hardly any middle class between the feudal lord in his castle and the common people in their wretched hovels. In England the so-called 'Jews' Houses' at Lincoln are a rare exception (see HOUSE).

From the anct Rom. tradition the Romanesque architects adopted certain features: the semicircular arch, the groined cross-vault (see VAULT), and even a modified and debased form of the Corinthian column with its capital of acanthus leaves. Occasionally, in early days, they used carved fragments of antique buildings. They made one important advance upon Rom. structural methods, in balancing the thrust of heavy vaults and domes by means of buttresses, and in substituting, for the thick vaults used by the Romans, a much thinner web supported on curved stone ribs.

Romanesque churches generally followed the basilican plan, with aisles and an apse; but transepts were often added, and sometimes the aisles were continued around the apse to form an ambulatory. Towers were now popular, the campanile (q.v.) having been invented cents. earlier, and Rome contains sev. graceful examples while the churches of the Rhineland bristle with gabled towers, and at Sompting in Sussex is a small tower of the same remarkable type (11th cent.). Numerous circular churches, too, were built during this period: based upon the precedent of the Early Christian baptistery, and thus ultimately derived from anct Rom. temples and tombs. The Knights Templars built four circular churches in England, taking as their model the Church of the Holy Sepulchre in Jerusalem, originally founded by Constantine.

Arcading (i.e. rows of semicircular arches, sometimes interlacing) was freely used as decoration on the towers, the walls, and even the interiors of churches. Windows were comparatively narrow, and round-headed. Doors also had round arches over them, the tympanum (i.e. the space between the lintel of the doorway and the arch) being usually carved. The jambs or sides of the doorway were decorated with crude and often grotesque carved mouldings (see **MOULDINGS**), and small shafts were recessed in them. The roofs of Romanesque churches were steep in N. Europe, whether the building was vaulted or not; but of much lower pitch in Italy, where the simple tiled roof of the Early Christian basilica was followed as an example. A certain amount of didactic religious wall-painting has survived; also some examples of Romanesque stained glass, e.g. at Canterbury. Perhaps the finest works of Romanesque craftsmen are the bronze doors of Hildesheim Cathedral in Germany, wrought in 1015-22. See A. K. Porter, *Medieval Architecture* (2 vols.), 1909; W. R. Lethaby, *Medieval Art* (2nd ed.), 1912; T. G. Jackson, *Byzantine and Romanesque Architecture* (2 vols.), 1920; G. T. Rivoira, *Lombardic Architecture* (2nd Eng. ed., 2 vols.), 1933; A. W. Clapham, *Romanesque Architecture in Western Europe*, 1936. (See also bibliography at end of **ENGLISH ARCHITECTURE**.)

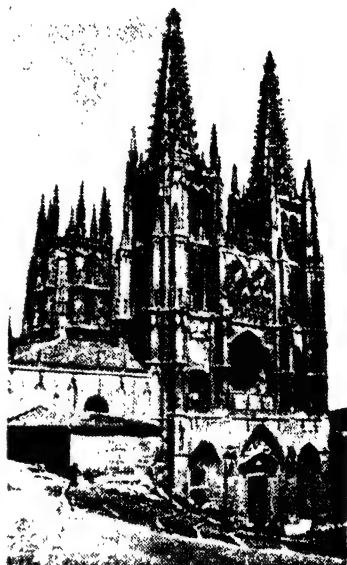
6. *Gothic*. Gothic was the architectural style used in certain countries of Europe from the end of the Romanesque period, c. 1200, to the advent of the Renaissance movement—in the 15th cent. in Italy, in the 16th cent. elsewhere. Although the term 'Gothic' is used to-day, as it has been for a hundred years, to describe a style which is universally regarded as splendid and beautiful, one must remember that it was originally applied simply as a term of contempt or a nickname, like 'Quaker' or 'Tory'; and was so used in the time of Wren (late 17th and early 18th cent.). At that date it was erroneously believed that the destruction of the classical monuments of Rome was due to the savage and barbarous Goths who sacked the city on five occasions during the 5th and 6th cents. A similar meaning is attached to the term 'Vandals'—the Vandals being another savage race who sacked Rome in 455.

Yet, as Gibbon (q.v.) pointed out nearly two hundred years ago, marauders of this type could not possibly have destroyed such massive structures, their opportunities being limited to portable loot; and the state of ruin into which these great buildings fell was due to the ravages of the weather, to cents. of neglect, and to their use as a convenient quarry throughout the Middle Ages and even in later times. Moreover the Goths never produced any definite A. of their own; so that to describe medieval A. as 'Gothic' was, in fact, absurd. See M. S. Briggs, *Goths and Vandals*, 1952.

In the 17th cent., when the term was first used, medieval A. was considered by connoisseurs to be uncouth and barbarous;

hence it was christened 'Gothic' because the Goths were regarded, quite rightly, as barbarous.

Gothic A. was essentially the style of the Catholic countries of Europe listed above, including Hungary and Poland; but it was also carried to Cyprus, Malta, and Palestine by the Crusaders and their successors in the Mediterranean. It was used for all secular buildings, and even for a few synagogues, as well as for cathedrals, churches, and monasteries.



W. F. Mansell

BURGOS CATHEDRAL.

An example of florid Gothic architecture in Spain.

The date of its beginnings may be safely placed at c. 1200 in all countries; but the date of its end varies according to the length of time that the new ideas of the Renaissance took to influence architectural fashions—as early as c. 1420 in Italy, the cradle of the movement; as late as c. 1540 or c. 1550 in England and NW. Europe. Gothic A. attained its highest excellence in France and England. In Germany, Belgium, Holland, Spain, and Switzerland it was largely borrowed from one of those two countries, especially from France. In Italy, because of the strength of the classical Rom. tradition, it never reached so high a level; and, for the same reason, it quickly succumbed to the Renaissance, which was itself a return to that tradition. For a description of the national characteristics of Gothic in various countries see **BELGIAN AND**

DUTCH, ENGLISH, FRENCH, GERMAN, IRISH, ITALIAN, SCANDINAVIAN, SCOTTISH, SPANISH ARCHITECTURE.

In the article AMERICAN ARCHITECTURE is mentioned a Gothic church in Virginia, U.S.A., built in 1632. This is a very belated example of Gothic, but is nearly contemporary with two Eng. examples—the church of St John at Leeds, 1624, and the magnificent fan-vaulted staircase at Christ Church, Oxford, 1640. The dominating feature of Gothic A. at all its stages and in all the countries mentioned is the pointed arch, which was first used in England at Fountains Abbey, Yorks, c. 1135, but had been used in France some years earlier. Up to comparatively recent times some scholars attributed the origin of this feature to the shape produced by interlacing of semicircular arches in an arcade; but now the invention of the pointed arch is universally ascribed to the Middle E., where it was used on a large scale in the great mosques of Samarra in Iraq (mid 9th cent.) and Ibn Tulun at Cairo (876-9, *see* MUSLIM ARCHITECTURE); but even that is not the beginning of the story, for pointed arches of the 6th cent. have been found in Syria. The idea may well have been brought to France and England by the Crusaders.

The pointed arch is, however, important as something more than a shape: its introduction enabled Gothic builders to solve many problems, and thus to develop the elaborate and highly scientific system of vaulting and buttressing which is the real basis of Gothic A., differentiating it from the heavier Romanesque (*see* VAULTING). This process of change lasted, in all, over a period of about half a cent., from c. 1150 to c. 1200, and is called the 'Transitional' period: thereafter mature and fully fledged Gothic came into being, c. 1200.

One result of the improved system of vaulting and buttressing was an increase of window area in the walls between buttresses, because these walls no longer had to carry the main weight of the roof, so could be thinner and could be pierced with impunity. The pointed arch was now used over windows, and these 'lancet' windows were grouped in twos or threes under an enclosing arch, the remaining enclosed space being pierced with small circular openings. Then the stonework between all the various windows and openings ('lights') in the group was reduced to slender stone bars ('mullions'), and the whole enclosed group of 'lights' became a single window, the upper portion within the arch being filled with 'tracery,' consisting at first of geometrical patterns, then of flowing patterns, and finally of quasi-rectangular openings forming a grid (*see* TRACERY). The effect of a grid was mainly due, however, to the introduction of horizontal transoms in the larger windows.

It is these phases of window design, rather than any vital principle of construction, which led Eng. writers of a cent. ago to divide Eng. Gothic A. into three main stages, viz. (i) Early Eng., c. 1200-1300; (ii) Decorated, c. 1300-70;

(iii) Perpendicular or Rectilinear, c. 1370-1540. (*See* ENGLISH ARCHITECTURE.)

The process of development in other European countries differed in many respects from that in England: reference is made to such differences in the various articles on national A. already mentioned. Thus France never had a 'Perpendicular' phase but produced a 'Flamboyant' phase unknown in England, though occasionally found in Scotland. It. Gothic is completely different from Eng. and Fr., and some It. cathedrals have striped exteriors of black and white



W. F. Mansell

ENGLISH GOTHIC: SALISBURY CATHEDRAL

marble. Many great Ger. churches were built of brick, not of stone. Flying buttresses, perhaps the most dramatic features of Fr. Gothic cathedrals, are only occasionally found in England, e.g. at Westminster Abbey, which is the most Fr. in character of our greater Gothic churches. Fan-vaulting, on the other hand, is a distinctly Eng. invention. Open timber roofs are seen at their best in Eng. Gothic churches and secular halls, the enormous oak roof of Westminster Hall (1397-9) being the finest example. This is a hammer-beam roof (q.v.), a type peculiar to England. The so-called 'Tudor Arch' (*see* ARCH) is also distinctively English, though something similar was used in Muslim buildings cents. before and is called the 'Persian arch.'

In the larger Romanesque churches, as already stated above, towers were numerous and conspicuous; but their roofs were generally finished with gables

or in pyramidal form. It was left to Gothic architects to develop lofty spires, of which there are numerous fine examples in most countries of W. Europe except Italy.

The differences between Fr. and Eng. church plans are noted in the articles on FRENCH and ENGLISH ARCHITECTURE. Gothic was not confined, however, to churches; and, in the various articles on the A. of individual countries, the chief Gothic secular buildings are mentioned. For the function, titles, and status of medieval architects see ARCHITECT. Stained glass (q.v.) had come into use during the Romanesque period; but its full development occurred in Gothic times; and all other branches of craftsmanship made great advances. Colour was freely used in the interior of the greater churches: not only in the form of stained glass, but also in wall-paintings of religious subjects, and in costly hangings and vestments.

The numerous details of Gothic A. (e.g. *Chevet*, *Crocket*, *Sedilia*) are described as separate items, alphabetically arranged. See E. Corroyer, *L'Architecture Gothique*, 1891; A. K. Porter, *Medieval Architecture* (2 vols.), 1909; G. H. West, *Gothic Architecture in England and France*, 1911; W. R. Lethaby, *Medieval Art* (2nd ed.), 1912; T. G. Jackson, *Gothic Architecture in France, England, and Italy* (2 vols.), 1915; J. Harvey, *The Gothic World*, 1950. (See also bibliography at end of each article on the national A. of various countries.)

7. Renaissance to c. 1800. As explained elsewhere (see RENAISSANCE) the Renaissance in general was a revival of interest in the classical culture of Greece and Rome, including A. and the other arts as well as literature. No specific dates can be given for its beginning or its end. It certainly began in Italy, but it took a cent. or more to reach other countries; and when it had taken root its progress continued until the Gothic Revival began in the first quarter of the 19th cent. In A. the cultural centre where it had its birth was Florence, the most enlightened and important of the numerous civic reps. in Italy, which at that time (c. 1420) was a mosaic of independent states, the largest being the kingdom of Naples in the S. and the papal dominions in the centre. Rome, which contained the classical ruins from which the first Renaissance architects drew their inspiration, had no more than 20,000 to 30,000 inhab. at the end of the 13th cent., and probably less after the Black Death had taken its toll in the next cent. Poggio (1380-1459) wrote thus of the condition of its great monuments: 'The public and private edifices, that were founded for eternity, lie prostrate, naked and broken, like the limbs of a mighty giant; and the ruin is the more visible from the stupendous relics that have survived the injuries of time and fortune.'

It was at this moment that Filippo Brunelleschi (q.v.), a young goldsmith of Florence, having been unsuccessful in the

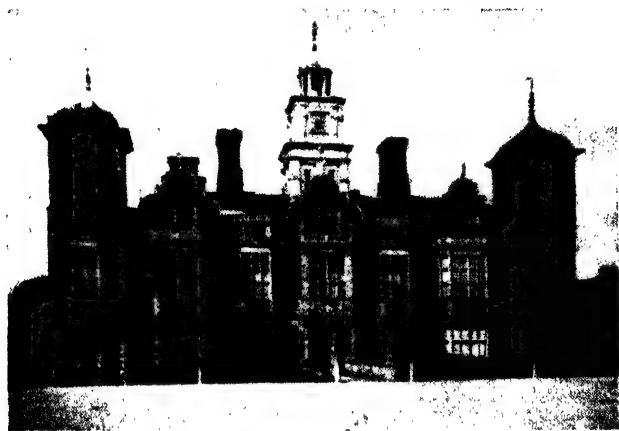
competition for bronze gates to the baptistery there in 1401, decided to turn to A., and visited Rome in order to make a first-hand study of the ancient buildings. He returned to his native city in 1407, and had his reward when his designs for completing the unfinished cupola of the cathedral were successful in 1420. In the same year, or thereabouts, he built the Pazzi Chapel adjoining St Croce in Florence; and this work may be regarded as the first church copied closely from Rom. A. During the next 30 years or so Renaissance A. was confined to Florence and its neighbourhood, the chief exponents being Brunelleschi himself and Michelozzi. By the middle of the 15th cent. the movement had spread a little further under the leadership of Alberti (q.v.), a many-sided man who had obtained a doctorate in law, and was talented as a poet and musician. Turning to A. in middle age, he designed his first building in 1446; and wrote a book on A., *De Re Aedificatoria*, which was pub. in 1485, after his death. The importance of Alberti is partly that he was the first architect since ancient Rom. days to formulate the rules of architectural design, and that he based these upon Rom. tradition. In due course he was followed by other It. writers who all adopted the same procedure. They included Serlio (q.v., 1475-1554), Vignola (q.v., 1507-73), Palladio (q.v., 1508-80), and Scamozzi (1552-1616). They all were able to quote the famous book on A. written by the ancient Rom. architect Vitruvius, the MS. of which seems to have been discovered in 1414 and was pub. in Rome in 1486. Thus architectural design in Italy, and ultimately in the rest of Europe, became a matter of Rom. precedent: that is why Renaissance A. has been called 'the Architecture of the Book.' The effect of all this scholarship varied in the different countries. In Italy the impatient genius of Michelangelo (q.v.), a sculptor-painter turned architect late in life, rebelled against so much pedantic dictation; and his deviations from orthodoxy led to the Baroque style, which was enthusiastically welcomed by the promoters of the Counter-Reformation, especially the Jesuits, and swept through the Catholic countries of Europe during the 17th cent. Baroque may be defined as a picturesque and unconventional form of Renaissance A.: sometimes wayward to the point of eccentricity, but often brilliantly effective in its treatment of masses and spaces, and in its relating of buildings to their surroundings. In France, England, the Netherlands, and Scandinavia its influence was less pronounced; but in all of them there are many important buildings which are more or less Baroque in character. Examples are noted in the various articles on the A. of individual countries. See also ARCHER, THOMAS; BERNINI; BIBIENA; BORROMINI; HAWKSMORE; VANBRUGH.

The stages by which the new Renaissance doctrines of architectural design gradually overcame the prevailing Gothic

tradition are briefly described in the articles on individual countries (*see* list in Section 6), where also the chief Renaissance buildings and their architects are named. The three channels through which the new gospel was communicated were: (i) It. craftsmen and architects working in other countries; (ii) It. books on A., already mentioned; (iii) visits of architects and wealthy aristocrats to Italy in order to study the Rom. ruins. In the first category are craftsmen such as Torrigiano who executed the monument of Henry VII in Westminster Abbey (1512); and the group of Italians

pub. *The Elements of Architecture*, an amusing little book based almost entirely upon Vitruvius but reinforced by personal study in Italy.

Far more important than either of these was Inigo Jones (q.v.), who, although a poor man, managed to spend years of study in Italy, concentrating mainly on the works of Palladio; and after returning to England was commissioned to design, for the king, the Queen's House at Greenwich (1617-35) and the Banqueting House at Whitehall (1619-22). These two remarkable buildings introduced into England the genuine Renaissance A. of



C.O.I.: Crown Copyright

BLICKLING HALL, NORFOLK

Jacobean house (1620), essentially in the English tradition.

who worked in France at Fontainebleau, Amboise, etc., for François I., among them Serlio the architect. The books mentioned were all trans. from the Italian sooner or later, and sold throughout Europe; but other less authentic works on the Orders (q.v.) and on classical design began to appear from the printing presses of Antwerp and Amsterdam. Some of them were produced by engravers with little knowledge of A., and resulted in mere caricatures of classical buildings. Their effect on architectural design was naturally unorthodox, hence the highly picturesque A. of the late 16th and early 17th cents. in the châteaux of the Loire, our own 'Elizabethan' and 'Jacobean' buildings, and the delightful gabled bn halls of so many quaint old Ger., Dutch, and Flem. cities. Some Fr. architects of the late 16th cent.—among them Delorme (q.v.) and Du Cerceau—had studied auct Rom. A. first hand in Italy, as had the Eng. architect, John Shute, who pub. in 1563 *The Chief Groundes of Architecture*. In 1624 a cultured diplomatist, Sir Henry Wotton,

Italy. Sir Christopher Wren (q.v.) never visited Italy personally, and his A. was never so wholeheartedly Italian as that of Jones. He himself, and still more some of his followers—Archer, Hawksmoor, and Vanbrugh (qq.v.)—showed some sympathy with Baroque. In the early 18th cent., however, there was another swing of the pendulum, back to the orthodox scholarship of Inigo Jones. Hence its practitioners were called the 'Palladian School' of architects. They included Burlington, Gibbs, Kent (qq.v.), and Colin Campbell.

Thus, in c. 1750, Eng. A. was definitely Palladian; while the Baroque style had petered out in Italy, Spain, Austria, Bavaria, Switzerland, and the other countries in which it had chiefly fl.; and Fr. A. stood midway between the two. The second half of the 18th cent. saw the beginning of the last phases of Renaissance A. In England two famous architects, Sir Wm Chambers and Robert Adam (qq.v.), were keen rivals for court patronage. Chambers continued the Palladian tradition, and wrote an excellent

text-book of architectural design on orthodox classical lines. His taste is exemplified in his greatest building, Somerset House, London. Adam, another student of the antique, favoured the delicate Hellenistic A. and decoration of Pompeii and Herculaneum, then recently discovered, rather than the more massive style of Palladio and Chambers. His influence was felt in America, where the simple building fashions of the New England and Virginia colonists had already given place to the more academic designs of the Renaissance (see AMERICAN ARCHITECTURE). France experienced no counterpart of the 'Adam' style; but, instead, produced a dainty frolicsome variant of Renaissance A. known as 'Rococo'—lighter and more feminine than Baroque, but equally unconventional. It soon spread into Germany and Switzerland; and one of its most attractive examples is the palace of Sans Souci at Potsdam (1745-7). See L. Palustre, *L'Architecture de la Renaissance*, 1892; M. S. Briggs, *Baroque Architecture*, 1913 (also in German, 1914); T. G. Jackson, *The Renaissance of Roman Architecture* (3 vols.), 1921-3; Geoffrey Scott, *The Architecture of Humanism*, 1924. (See also bibliography in each article on the A. of individual countries.)

S. *The Nineteenth Century*. The hist. of European A. in general, and of Eng. A. in particular, is more complicated during the 19th cent. than in any cent. that preceded it, because it includes more than one 'revival' of earlier styles. There was an upheaval in the 16th cent. when Renaissance fashions from Italy interrupted the long-established Gothic tradition; but the 19th cent. witnessed a lengthy competition between the Classic and Gothic schools in nearly every European country and particularly in Britain. As already mentioned, there was keen rivalry during the second half of the 18th cent. between two architects—Chambers, the upholder of 'Palladianism,' and Adam, the practitioner of a more original style on Pompeian lines; but both schools of thought traced their inspiration back to Italy. The next star in the architectural firmament was John Nash (q.v.), 1752-1835, who introduced the style known as 'Regency' because it was so warmly encouraged by the Prince of Wales, afterwards George IV, during the years 1810-20 when he was Prince Regent. This decorous and refined style, which owes much to both Chambers and Adam, is associated with an extensive use of stucco, and may be seen to advantage at Hove, Brighton, Weymouth, Cheltenham, Clifton, and Tunbridge Wells, as well as in the terraces and mansions in 'the Regent's Park' in London. It constituted the last phase of that 'Georgian' A. which had been in vogue since 1725 or so. In much of Nash's work, however, the influence of Greece as well as that of Rome is apparent, and this may be traced, once more, to books. Greece, long inaccessible hitherto, had been visited by many architects and connoisseurs during the second half of the

18th cent.; Stuart and Revett pub. their vol. on *The Antiquities of Athens* in 1762; and the 'Elgin Marbles' arrived in London from Athens in 1801.

Thus was born the 'Greek Revival,' which lasted for a few years abreast of the 'Regency' style. Typical examples are the Athenaeum Club (1827-30) by D. Burton (q.v.) and St Pancras Church (1819-22) by H. W. Inwood, both in London; Downing College, Cambridge (1820), by W. Wilkins; and sev. buildings in Edinburgh by W. H. Playfair (see SCOTTISH ARCHITECTURE). Simultaneously there was in Germany a Gk Revival, which produced a number of important buildings in Munich by L. von Klenze and in Berlin by Schinkel (q.v., see also GERMAN ARCHITECTURE). In France, thanks to learned antiquarian books written by Percier and Fontaine, the so-called 'Empire' style was launched, and lasted c. 1805-30; but the position was complicated by the fact that Napoleon's campaigns in Egypt (1798-1801) had also created a short-lived vogue for Egyptian A. Even Russia and Spain had their Gk Revivals; and the movement fl. in the United States, where typical examples are the Capitol at Columbus, Ohio (1839-58); and Girard College and the Bank of Pennsylvania, both in Philadelphia.

Abreast of all this classical revivalism another very different movement was growing, especially in England. As long ago as 1753 the famous diarist and connoisseur Horace Walpole (q.v.) had built near Twickenham an ornate and picturesque villa in the Gothic style (which he called 'Strawberry Hill'), at a time when everything Gothic was despised by men of taste. A passion for romance and the brave days of chivalry arose about the same time, and rich noblemen erected sham ruins—'Gothic' as well as 'Roman'—as ornamental features in their parks. Here and there a belated specimen of Gothic church A. was built; but it was not until 1818, when Parliament voted a million pounds for building new Anglican churches, that the real Gothic boom began. Out of 214 churches provided under that Act, no less than 174 were in a Gothic or near-Gothic style. One of the best specimens is St Luke's, Chelsea, London (1820-4). The causes of this sudden change are too complex for explanation here; but it may be said that one of them was the romantic movement in literature. Once started, the Gothic Revival spread like wildfire; and from that date onwards, for nearly a cent., most churches in England were in the Gothic style.

For public buildings, however, some variety of It. Renaissance or Rom. A. continued to be favoured. St George's Hall at Liverpool (1815) by H. L. Elmes (q.v.), Leeds Town Hall (1853-8) by C. Brodric, and Birmingham Town Hall (1832-50) by J. Hansom are characteristic specimens; as is C. Barry's Reform Club (1837) in London. When, however, it became necessary in 1834 to rebuild the Houses of Parliament, the

proximity of Westminster Abbey induced the authorities to prescribe a Gothic or Elizabethan style; and a Gothic design by Barry won the competition, with the result that we now see. From that moment the 'Battle of the Styles' began between the advocates of Gothic and Classic, reaching its climax during the fierce debates in Parliament over the competition for a new India Office and Foreign Office, 1855-72. Sir George Gilbert Scott (q.v.), the most eminent architect of the day, was then instructed to convert his Gothic design into the It.

historical styles, and the use of 'traditional' materials such as brick, stone, and timber. True, Alfred Waterhouse (q.v.) introduced terra-cotta on a large scale, and many of his buildings presented a comparatively original but Romanesque effect, as did those of H. H. Richardson (q.v.) in the United States; and something similar occurred in Canada.

It is fair to say that, in 1900, the Gothic Revival had expired for public buildings, but that Gothic was still favoured for churches; that 'Free Classic' was universally adopted for public buildings; and



Bedford & Lemere

THE NEW ADELPHI TERRACE, LONDON

Officially opened in 1938. Architect, Stanley Hamp.

Renaissance form in which it was finally approved. (See the article ENGLISH ARCHITECTURE for a list of leading architects of the Victorian period, 1837-1901; also the separate biographies of those mentioned, naming their prin. buildings. It is impossible to label them 'Gothic' or 'Classic,' because many of them were prepared to make the best of both worlds by working in either style as the occasion seemed to demand.)

Almost up to 1901 there was this duality of expression, though few Continental countries were so powerfully affected by it as England, Canada, and the United States. Even in India there are examples of both Gk and Gothic revivalism, erected under Brit. rule. Confused as was this rivalry between the two schools of design, it was further complicated in the last quarter of the cent. by revivals of Jacobean and finally of 'Queen Anne' A. (see SHAW, R. N.). The only feature common to all these movements was the revival of bygone

either 'Elizabethan' or 'Georgian' for the larger houses. The great mass of small dwellings (see HOUSE) was provided by speculative builders, and the services of an architect were seldom utilised. Meanwhile structural ironwork had come into use everywhere, but was invariably concealed by a 'period' facing of stone or brick, or else by terra-cotta. A similar state of affairs prevailed in Amer. and Continental countries. See K. Clark, *The Gothic Revival* (2nd ed.), 1950; R. Turner, *Nineteenth Century Architecture in Britain*, 1950; H. S. Goodhart-Rendel, *English Architecture since the Regency*, 1953. (See also bibliographies at end of each article on the A. of individual countries.)

9. *The Twentieth Century.* The early years of the 20th cent., before the First World War began, witnessed the birth of what has been termed the 'Modern Movement' in A.—rather foolishly, because every movement eventually becomes obsolete, and therefore 'modern'

no longer. 'Contemporary' is another relative term, constantly becoming out of date. Yet undoubtedly there was a significant change in architectural design just before the war occurred to interrupt it throughout Europe; and perhaps the word 'Functional' best describes it. In the 19th cent. Sir George Gilbert Scott (q.v.) designed St Pancras station and the Leeds Infirmary in his favourite form of Continental Gothic. The hospital had pointed windows filled with tracery—obviously obstructing the light and ventilation, and impeding cleanliness in a smoky city. (Another architect in Leeds designed a brick factory chimney

and 'period' features, and for its construction with simple, honest materials. Very different are the delightful houses erected between c. 1890 and c. 1914 by C. F. A. Voysey (q.v.), so refreshingly free from Victorian pretentiousness and Edwardian ostentation, so English, and so original. Rather more striking in design is the Glasgow School of Art (1896–1906) by C. R. Mackintosh (q.v.), where all revived historical features are cast aside and the building is most definitely planned for its modern purpose. Both these architects had their idiosyncrasies of design; but neither of them adopted fully the somewhat eccentric style which,



Wates Ltd

L.C.C. FLATS AT WANDSWORTH

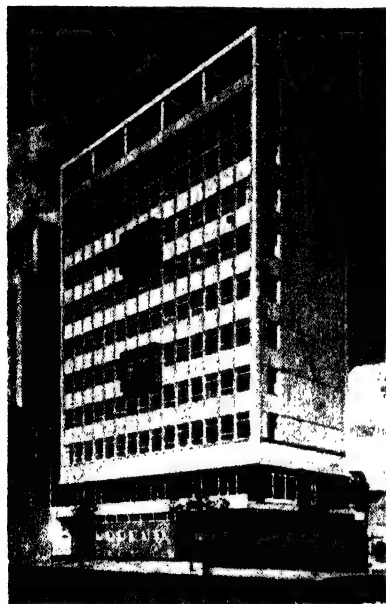
as a direct copy of Giotto's sparkling marble *campanile* in Florence!) Both those designs were unfunctional.

St Pancras station is more difficult to condemn, because its picturesque grouping may have had a publicity value which perhaps counted for something before the railways were nationalised. Since it was built, however, a more distinctive and sensible type of station A. has been evolved, notably at Rome and in many Fr. and Ger. cities, as well as in the smaller London Transport stations. Most of the Continental Gothic—Flem. and Venetian—which was so lamentably popular in the third quarter of the 19th cent. was the direct outcome of the books and lectures of John Ruskin (q.v.), then regarded as an inspired prophet. His disciple, Wm Morris (q.v.), brought these fancies down to practicality by demanding honest workmanship before ornament, and in 1854 built himself the Red House at Bexley, Kent, from the designs of Philip Webb. This building, though widely acclaimed to-day, is in fact a mediocre design, noteworthy only for the absence of superfluous ornament

under the title 'L'Art Nouveau,' had been evolved in Vienna in the nineties and had made some impression on Continental countries. Long before Mackintosh and Voysey appeared on the scene, however, the Crystal Palace had been designed for the Great Exhibition of 1851 in Hyde Park by Joseph Paxton (q.v.), who was not an architect at all, but a talented working gardener who had previously designed some large hothouses. This gigantic structure, whether it be regarded as 'architecture' or not, was notable for its frank acceptance of iron as a building material, and as such is a landmark in hist. Nevertheless it had no immediate influence on contemporary architectural design. Structural ironwork was increasingly used in buildings, but, to render it fireproof, had to be cased; and the mood of the day chose to make iron (and later, steel) the core of classical columns of apparently solid stone. At the turn of the cent. the invention of reinforced concrete (q.v.) revolutionised building construction, and A. had to yield to its demands and its potentialities. Invented in France, its use was slowly

adopted in England and soon had its effect upon architectural forms.

Since 1900 the pioneers of the 'Modern Movement' have come from France (see 'LE CORBUSIER'; PERRET), Finland (see AALTO; SAARINEN), Germany (see BEHRENS; GROPIUS; MENDELSSOHN; VAN DER ROHE), Holland (see BERLAGE; DUDOK), and, since 1940 or so, the United States (see NEUTRA; F. L. WRIGHT), Brazil, Italy, Mexico, and Switzerland, with the Scandinavian



Wates Ltd

OFFICES OF THE NATIONAL
LABOUR BOARD, LONDON

countries contributing their quota; but Britain too has supplied its share (see EASTON; E. M. FRY; F. GIBBERD; H. M. ROBERTSON; B. SPENCE; see also articles on AMERICAN, DUTCH, ENGLISH, FRENCH, GERMAN, ITALIAN, RUSSIAN, SCANDINAVIAN, SPANISH ARCHITECTURE). The writings of Gropius and of Le Corbusier have played a large part in explaining and popularising the movement.

The outstanding and distinctive features of 20th-cent. A. in Europe and elsewhere are planning strictly for the functional purpose for which the building is required; the elimination of all load-bearing walls, and the substitution for them of thin weather-proof panels between columns and beams; flat roofs; a structural frame of reinforced concrete in which floors, roofs, and vertical supports form a homogeneous whole;

extensive use of cantilever construction, and of balconies where required; a generous and sometimes excessive provision of window area; some form of central heating by which only one central flue and chimney is required; elimination of all arches and vaults, and of the classic orders, Gothic tracery, leaded windows, picturesque chimneys, and all other traditional and historical forms; omission of all superfluous ornament; use of plastic instead of wood flooring; and an extensive reliance upon prefabrication of structural units and equipment, based upon systematic standardisation. This tendency was accelerated after the Second World War, when the acute housing situation in all countries called for new methods. It was realised that one way of speeding erection was to reduce work on building sites to a minimum by having all possible components made beforehand in factories, where delays caused by inclement weather do not occur. (For other distinctive features of contemporary domestic A. see HOUSE.) In conclusion, it must be added that only a proportion of the total building work carried out in the 20th cent. entirely follows the 'Modern Movement': a large amount continues to utilise traditional design, materials, and methods of construction. See C. Marriott, *Modern English Architecture*, 1924; 'Le Corbusier,' *Towards a New Architecture*, 1927; (A. A. Platz, *Die Baukunst der Neuesten Zeit*, 1930; Sir R. Blomfield, *Modernismus*, 1934 (an amusing but bitter attack on the 'Modern Movement'); W. Gropius, *The New Architecture and the Bauhaus*, 1935; N. Pevsner, *Makers of the Modern Movement*, 1936; F. R. S. Yorke and C. Penn, *A Key to Modern Architecture*, 1939; J. M. Richards, *An Introduction to Modern Architecture*, 1940; M. S. Briggs, *Building To-day* (2nd ed.), 1948.

Architrave, in architecture, either (i) in any of the Gk or Rom. 'Orders,' the lowest member of the entablature (q.v.); or (ii) a moulding around a doorway or a window-opening.

Archives, collection of documents, now usually refers to gov. records. For further details see HISTORICAL MANUSCRIPTS COMMISSION and PUBLIC RECORD OFFICE.

Archivolt, in architecture, a moulding around an arch.

Archlute, large lute of the theorbo type with 2 sets of strings, the pegs of which were set at different distances in the double neck; the longer bass strings had no fingerboard and could therefore not be altered in pitch during performance.

Archons, ann. magistrates in the Athenian democracy. According to tradition, the last King of Athens, Codrus, was succeeded by his son Medon as A. instead of king. The historical development of the office can probably be traced to the reduction of the power of the original basileus (king), who was left with religious functions only by the military and civil powers being handed over to other officials. There were 9 A.; the

chief, or A. eponymous, who gave his name to the year and dealt with domestic cases; the basileus, with religious powers; the polemarch, who had jurisdiction in military and foreign matters; and 6 thesmothetae. For a detailed account of their functions, see Aristotle, *Athenian Constitution*.

Archpriest, an eccles. term dating from the 4th cent., and originally applied to a senior priest attached to a cathedral as assistant to the bishop and overseer of the subordinate clergy. The modern representative of the office is a dean. The term had a special application in the early 17th cent. to the superiors appointed by the Pope to govern secular priests sent into England. These had been left without a head at the death of Cardinal Allen in 1594. The archpriest had 12 assistants, but was subordinate to the superior of the Jesuits in England. The office, which was much opposed, lapsed in 1621.

Archytas (c. 428-347 BC), of Tarentum, Gk philosopher of the Pythagorean school, scientist, and general. He was an intimate friend of Plato. A. was the founder of scientific mechanics, and did much to advance the study of music and acoustics. Besides evolving an ingenious method of doubling the cube, he is said by Aulus Gellius (*Noctes Atticae*, x. 12, 9) to have invented a kind of flying machine. Some fragments of his ethical and metaphysical writings have survived.

Arceis-sur-Aube, Fr. tn in the dept of Aube, on the R. Aube, 16 m. NE. of Troyes. It was the bp. of Danton, and the scene of an Allied success against Napoleon, 20-21 Mar. 1814. Pop. 2200.

Arceograph, see CYCLOGRAPH.

Areole, It. tn, in Veneto (q.v.). 15 m. ESE. of Verona (q.v.), on the Alpone, a trib. of the Adige. The victory of Napoleon (q.v.) here in Nov. 1796 forced the Austrians to abandon the attempt to relieve Mantua. Pop. 4500.

Aroos, Don Rodrigue Ponce de Leon, Duke of (fl. 1646), Sp. Viceroy of Naples 1646-8, whose crushing taxation caused the revolt of the people of Naples under Aniello. After 1648 the Duke of A. retired from political life.

Arcoot: 1. Name of 2 contiguous dists. of Madras, India. N. A. is bounded on the N. by Chittoor and Mysore, on the E. by Chingleput, on the S. by S. A., on the W. by Salem, and on the NW. by the SE. Ghats. The products are mainly agric.: rice, peanuts, sesame, sugarcane, cotton, and tobacco; there are also mango and orange groves. Industries include rice- and sugar- milling and the extraction of peanut- and sesame-oil. Area 4671 sq. m.; pop. 2,577,540 (93 per cent Hindu). S. A. is bounded on the N. by N. A. and Chingleput, on the E. by the Coleroon R., on the S. by Tanjore and Trichinopoly, on the SW. by the Kalrayan Hills, and on the W. by Salem. Products include rice, peanuts, sugarcane, sesame, and cotton; there are extensive cashewnut and casuarina plantations along the coast. Industries include rice- and sugar-milling, peanut- and sesame-oil extraction,

and hand-loom cotton and silk weaving. There is widespread quarrying of granite and other building stone. Area 4205 sq. m.; pop. 2,608,753. Both dists. are flat on the coast; hilly, with jungles, inland. A. was the scene of the 18th-cent. struggle for supremacy between the French and English in India, and was ceded to the English in 1801.

2. City of N. A. dist., Madras State, India, on Palar R., 65 m. SW. of Madras and 13 m. E. of Vellore. Here Clive withstood a famous siege in 1731. Not many relics of the time survive, but Clive's Room is still shown in the Delhi Gate. Rice, sugarcane, and peanuts are produced, and there is cotton weaving.

Arctic Animals do not present great variety. Molluscs, annelids, and jelly-fish are common to all the N. seas, while such fish as the salmon, cod, and halibut are plentiful, and provide employment for European sailors. Insects are found far N., such as bees, flies, and butterflies, but as the flora is scanty they do not occur in great abundance. The birds are chiefly sea birds, as petrels, elder ducks, cormorants, auks, gulls, puffins, and guillemots, and all are migratory. The mammals include the walrus, seals, and sev. varieties of whale—the white whale and narwhal, grampus, and bottle-nosed whale, but the whalebone whale (*Balaena mystecetis*) is becoming rare; the polar bear, reindeer, elk, fox, wolf, ermine, and musk-ox are the prin. terrestrial mammals. Insectivorous and herbivorous habits are naturally almost absent in A. A., which are piscivorous or carnivorous as they dwell chiefly in the sea or on land. Many of them exhibit the curious phenomenon of becoming snowy-white in winter, and among these are birds, as the ptarmigan, and mammals, as the hares and lemmings, which are brown in summer, and the Arctic fox, which is salty-blue in summer; the polar bear is, of course, white all the year round. See *Manual of Natural History of Greenland*, by T. Jones, pub. by the Admiralty, 1875; A. Hellprin, *Geographical and Geological Distribution of Animals*, 1887; S. P. Gordon, *Amid Snowy Wastes: Wild Life*, 1922; V. Stefánsson, *Hunters of the Great North*, 1923.

Arctic Circle, The, is an imaginary circle drawn round the N. Pole at a distance of 23½ degrees therefrom, this angle being equal to the angle between the plane of the equator and the plane of the ecliptic. Within these limits the sun disappears entirely from view for a certain period in the year, and for another period is always visible. The length of these periods varies with the nearness to the Pole, the nearer the Pole the longer the period during which the sun is continually above (or below) the horizon.

Arctic Exploration. The first Arctic voyagers were the Vikings who discovered Iceland and Greenland and colonised them. After the time of Harald Hardraade the Northmen gave up adventure in the N. seas, and it was only in the 15th cent., when the English and Dutch led the van of seafaring nations, that

A. E. was revived in the search for a supposititious N.E. or N.W. passage to China or India. The first of the navigators stimulated by the success of Columbus in the field of exploration to renewed efforts to discover a W. route to Cathay was Sebastian Cabot, who in 1496 sailed from England towards the N.W. Little is known of Cabot's voyage, though it seems, according to a contemporary account, that he must, before turning eastward in despair, have sailed into the Gulf of St. Lawrence and partly through the straits of Belle Isle from the N. opening, from which the coast of Labrador sweeps to the W., and so on to Shekatika Bay, where that coast trends eastward (51° N.). In 1553 the Muscovy Company of London Merchants, formed to promote commerce with Russia and the E., prepared an expedition 'for the discovery of Cathay, and divers other regions, dominions, islands, and places unknown,' by the exploration of the seas eastward of the N. Cape. The expedition, consisting of 3 ships, set out from Ratcliffe under the command of Sir Hugh Willoughby. The record of Willoughby's wanderings, probably along the coast of Novaya Zemlya, was learnt from the explorer's own jour. when, the following year (1554), some Russian fishermen found him and his crew, frozen to death, at the mouth of the riv. called 'Arzina.' in Lapland. Richard Chancellor, who commanded the larger of the other 2 ships, reaching Wardhus (Vardöhus) on Vardö Is. in safety. The narrative of Chancellor's expedition, which was written by Clement Adams and preserved by Hakluyt, shows that Chancellor entered the White Sea, till then unknown to the civilised world, and explored the country round Archangel. After this follow the 3 voyages of Martin Frobisher in quest of a N.W. passage to Asia. None of these or any of the attempts made at this time resulted in the wished-for discovery. In his first voyage Frobisher (q.v.) found a bay which has since been named after him, in 61° N., and landed on an is. since called Gabriel Is., where his party for the first time in the hist. of Englishmen encountered the Eskimo. In 1577 Frobisher made his second journey. He anchored in what was named by him Jackman's Bay, believing, indeed, that he had solved the problem of a N.W. passage to Asia, and landing on what is now known as Foxe Peninsula formally took possession in the name of the queen. Marching into the interior, his party discovered nothing at first but mosses, lichens, and a few juniper bushes and stunted firs. The third expedition sailed from the Thames in May 1578. The only result of the voyage was the finding of what was supposed to be gold, but which in all probability was merely ferruginous or cupreous pyrites, upon an is. in Beare Sound, which they named Countess of Sussex Is. In 1585 John Davis (q.v.) renewed the attempt to discover a N.W. passage to the E., publishing in 1595 a short narrative of his 3 voyages (1585-1587) entitled *The World's Hydrographical*

Description. The net results of Davis's first voyages were a better understanding with the natives of Greenland—the W. coast of which he explored up to 64° N., naming it Desolation—and the discovery that land still hemmed him in as far as 67° N. In his last voyage he sailed through Davis Strait and the bay which was not explored till close upon 30 years later by Baffin and since called Baffin Bay, as far N. as Melville Bay. Ten years later Barents (q.v.), the Dutch navigator, made his celebrated voyage in search of a N.E. route to China, and the narrative of his perils and death forms one of the most interesting and pathetic records of human bravery and endurance. The scene of his wintry sojourning in Novaya Zemlya was not revisited for nearly 300 years, when Capt. Carlsen, in 1871, landed there and found the wooden house, the ashes still upon the hearth, as the explorers had left it, together with an old clock, Barents's flute, and other interesting relics of the expedition, all of which are now in the possession of the Dutch Gov. With Barents seems to end the quest for a short route to the E., or rather that quest is lost sight of in the general exploration of the Arctic. Hudson's first voyage (q.v.) took place in 1607, and resulted in the discovery of one of the most easterly points of the E. coast of Greenland (73° N.), called Hold with Hope. He penetrated as far N. as 80° 23', and on returning discovered Jan Mayen Is. In 1610 he discovered Hudson Strait and the large bay which has left his name to posterity. His voyages opened the way to the Spitzbergen whale fisheries. In 1612-13 Sir Thos. Button, supported by the Merchant Adventurers of London, entered Hudson Bay, and crossing over westward explored Southampton Is. up to 65° N. Baffin as pilot and navigator in the *Discovery* investigated the coasts of Hudson Strait in 1615, and later, with the same ship, circumnavigated the great sound with its numerous trib. channels, which has since received the name of Baffin Bay. There was but little in the way of fresh discovery in the years immediately following the efforts of the 16th- and 17th-cent. explorers, though much was done to reap the benefits of their discoveries. After the formation of the Hudson's Bay Company, the company's servants, towards the latter part of the 18th cent., effected some important journeys to explore the shores of the Amer. polar seas, Samuel Hearne navigating the Coppermine R. to the Polar Sea, and Alexander Mackenzie discovering the mouth of the riv. named after him. Dutch rivalry in A. E. resulted in Marten's visit in 1671 to the Spitzbergen group of is., and the best record of the natural hist. and physical features of that part prior to Scoresby's *Account of the Arctic Regions*; in the discovery by Capt. Gillis in 1707 of 'Gillis Land,' and in the opening up of the Dutch whale fisheries of Davis Strait. In 1806 the intrepid fisher and scientific observer, Scoresby, advanced his ship, the *Resolution*, up to 81° 12' N., and 16

years later, forcing a passage through the ice barring the approach to the E. coast of Greenland, he surveyed that coast for a distance of 400 m. In the course of the 18th cent. Russian explorers penetrated to the most northerly parts of Siberia, Lt. Chelyuskin in 1735 reaching the cape in 77° 25' N. which bears his name; while Hering, a Dane, put by Peter the Great in command of the *St Paul*, set out from Okhotsk to explore the Amer. side of the strait which he had discovered 12 years previously, and which is named after him. After finding Mt St Elias he was wrecked and perished in the vicinity of the Aleutian Is.

A. E. appears to have been dropped in England towards the last quarter of the 18th cent., and it was only with difficulty that the gov. could be induced to support even voyages of scientific research in polar regions. In 1778, however, Capt. Cook was instructed to sail northward from Kamchatka and look for a NE. or NW. passage from the Pacific to the Atlantic. He reached Cape Prince of Wales, the W. extremity of America, and after passing through Bering Strait found his way barred by ice. In 1815 the search for the NW. passage was revived in England by the strenuous advocacy of Sir John Barrow, through whose influence a reward of £20,000 was offered for its accomplishment, and £5000 for reaching 89° N. (1818). The most celebrated names during this period of revival were those of Lts. W. E. Parry and John Franklin, whose chief discoveries between 1819 and 1827 were Lancaster Sound, the continuation of which was called Barrow Strait, an archipelago, now known as Parry Is., Fury and Hecla Strait (a channel leading W. from the head of Hudson Bay), and Prince Regent Inlet, a wide opening observed on the third voyage in 1824 to the S. from Lancaster Sound. In 1827 a new chapter opens in A. E. with Parry's attempt to reach the Pole from Spitsbergen. This attempt was remarkable for the fact that the explorer abandoned his ship and endeavoured to make his way over the northward drift-ice with boats which his party dragged along on sledges. He reached the then highest lat. (82° 45'), but, carried southward by the current, he was forced to return. Prior to Sir John Franklin's ill-starred expedition in 1845, Capt. John Ross, with the financial assistance of Sir Felix Booth, a distiller, set out in a small steamer, the *Victory*, on a private expedition of discovery. The most remarkable feature of this expedition was Ross's sledge journey, after abandoning his ship, across the ice. In the course of his voyage he discovered the Gulf of Boothia (named after his patron) and King William Is., and located the position of the N. Magnetic Pole. In 1845 Franklin, with the *Erebus* and *Terror*, set out on his tragic journey through the channels of that dense ice-packed region called by Sir George Nares the Palaeocrystic Sea to Beechey Is., along the W. shore of Somerset Is. (discovered by Parry

in 1819), through a southward channel called Peel Sound to King William Is., in the effort to reach some channel to Bering Strait. It appears, however, that the great ice floes from the vicinity of Melville Is. rendered all progress impossible save by rounding the E. side of King William Is.; Franklin did not know that this latter was an Is., and so perished with all his party. Numerous expeditions for some years afterwards endeavoured to ascertain Franklin's fate. Sir James Ross, in 1848, was sent with 2 ships, the *Enterprise* and the *Investigator*, by way of Lancaster Sound, and with Lt. M'Clintock made a long sledge journey along the N. and W. coasts of Somerset Is. In 1850 elaborate and extensive plans of search were organised under Capt. Penny, Austin, Ommaney, Lts. M'Clintock, Collinson, and McClure. Austin and Penny went through Barrow Strait and discovered Franklin's winter quarters of 1845-6 at Beechey Is. This party wintered on the S. coast of Cornwallis Is. and arranged sledge travelling excursions for the spring, Penny undertaking the Wellington Channel route, M'Clintock advancing to Melville Is., while Capt. Ommaney went southward, discovering Prince of Wales Is., and Lt. Brown investigated the W. shore of Peel Sound. In 1851 Lady Franklin sent out the schooner *Prince Albert* under Capt. Kennedy and Lt. Bellot of the Fr. Navy, the Frenchman discovering in the course of a long sledge journey Bellot Strait separating Somerset Is. from Boothia Peninsula, thus proving that this part of the Boothia Peninsula was the N. extremity of the continent of America. In May 1851 Collinson, in the *Enterprise*, penetrated the narrow Prince of Wales Strait between Banks Is. and Prince Albert Peninsula, reaching Princess Royal Is., where M'Clure had been the previous year. He then wintered in Victoria Is. and dispatched travelling parties in the spring of 1852 to explore Prince of Wales Strait and the S. portion of Prince Albert Peninsula. When the ship was free Collinson went E. along the coast of N. America, and after wintering a second time in Cambridge Bay, he examined the shores of Victoria Is. up to 70° 26' N. and westward to 100° 45', being within a few m. of Point Victory, where, indeed, he would have learnt the fate of Franklin. This great voyage was only completed in 1854, when Collinson brought back the *Enterprise* safely to England. In the meanwhile M'Clure, in the *Investigator*, had passed the winter of 1850-1 30 m. from Barrow Strait at the Princess Royal Is., and actually saw a NW. passage, which, however, he could not reach on account of a branch of the palaeocrystic ice that had baffled Franklin off King William Is. This ultimately forced him southward round Banks Is., whence he endeavoured to drive a passage to the N. between the W. shore of King William Is. and the cliff-like ice walls. Eventually, after the narrowest escapes, he took refuge on the N. shore of Banks Is., and in the early part of 1853, after preparing

to abandon his ship for the Amer. coast, was fortunately rescued. In 1852 the Brit. Gov. dispatched another expedition via Lancaster Sound, under Sir Edward Belcher, Sherard Osborn, Capt. Kellett, and M'Clintock. M'Clure's record was discovered by Lt. Mecham, one of the sledge travellers of this expedition. This discovery soon led to the succour of M'Clure, who thus partly by ship and partly by travelling over ice had now in fact accomplished the NW. passage, for which long-sought prize he was knighted, and, together with his party, received a grant of £10,000. In 1854 Dr Rae, whose previous work in A. E. was in 1846-7, when he crossed the isthmus joining Melville Peninsula with the mainland and skirted the shores of Committee Bay and the E. coast of Boothia as far as Lord Mayor Bay, joined Sir J. Richardson in a search for Franklin. He brought home tidings of Franklin's expedition from the Eskimo, the immediate consequence of which was that M'Clintock, in the *Fox*, with Capt. Allen Young and Lt. Hobson, prosecuted a thorough search of the W. coast of Boothia, the whole shore of King William Is., and Montreal Is. Eventually this party came upon a paper outlining the voyage of Franklin and telling of his death in June 1847 and the departure of the survivors in an attempt to make the Great Fish R., in which attempt none ever succeeded, though sev. traces of their struggles were subsequently found. M'Clintock's voyage proved that Franklin's expedition did in fact discover a sea route from the Atlantic through the channels S. of Victoria Is. to Bering Strait, and since that time Capt. Hall and Lt. Schwatka, of the U.S. Navy and Army respectively, have discovered other relics of Franklin's expedition. A notable expedition in quest of Franklin was that of Dr Elisha Kent Kane of the U.S. Navy, who, sent out by the U.S. Gov. in 1852 to look for the Eng. explorer, made his winter quarters in Rensselaer Bugt, W. Greenland, and with his boat, the *Advance*, pushed on to Smith Sound, where his further progress was stopped by ice at the entrance. Kane's contributions to A. E. contain a great deal of valuable information as to fauna, flora, magnetic conditions, and climate; the first really authentic and detailed account of the Ethal Eskimo; and, by his sledge journeys, the making known to the world of the marvellous waterways along the W. of Greenland between Smith Sound and the Atlantic Ocean, which afford the acknowledged easiest route to the Pole.

In 1871 Charles Hall, of Cincinnati, took the *Polaris* for 250 m. up the channel which runs N. from Smith Sound. He reached an unprecedented lat. by ship, and explored Ellesmere Is. to within 412 m. of the Pole. In 1875-6 Sir George Nares, with Lts. Aldrich, Markham, and Beaumont, touched 83° 20' N., after pushing along Ellesmere Is. to 85° W. long, and Greenland to Wulff's Land. In 1883 Lt. Greely, of the U.S. Army, made extremely valuable observations round Lady Franklin Bay (81° 44') on the

fauna and flora, climate, tides, and magnetism of this region. During the sojourn of the Greely expedition (1881-4), Lt. Lockwood, by touching 83° 24', gained for the U.S.A. the honour of reaching the then farthest N. The next most important work of this period was the traversing of the great ice sheet forming the interior of Greenland by Nansen (1888-9). Nansen's theory was that a current flowed at some point between the Pole and Zemlya Frantseva-Iosifa from the E. Siberian Sea to the E. coast of Greenland; and his objective was to investigate the great unknown region that surrounded the Pole, and in 1893, in the *Fram*, a ship specially designed to sustain and rise to powerful ice-pressure, he set out on his brilliant expedition to cross the polar ocean by relying on the drift from E. to W. after deliberately forcing the ship into the ice. The *Fram* ultimately emerged from the pack to the N. of Spitsbergen, Nansen's chief discovery being to ascertain the existence of a very deep ocean to the N. of the Franz Josef group, which was found to be a continuation of the water to the N. of Spitsbergen. In April of 1895 Nansen with a single companion, Johansen, left his ship, and by means of kayaks and sledges drawn by dogs reached farthest N. (86° 13'). Nansen's theories are on the whole sound, and the light he threw on what has been called the polar question estab. his fame for all time. Peary in 1892 and 1895 made journeys over the inland ice of N. Greenland, but beyond ascertaining the N. limit of the Greenland ice sheet added little to general information. Then in 1897 the Jackson-Harmsworth expedition in the *Windward* explored the W. part of Zemlya Frantseva-Iosifa, discovered a wide channel opening on a northward sea, and made important magnetic and meteorological observations. In 1897 Andree, with Fraenkel and Strindberg, set out on his unhappy balloon journey. Except for buoys cast overboard, nothing further was heard of this expedition until 1930, when their bodies were found in White Is., Kviteya, near Spitsbergen. The latest of 3 buoys found showed that the balloon reached 82° N. 25° E., but no other traces were discovered until 1930. Then Andree's diary showed that at one time the balloon reached a point a little higher than 83° N. In 1899 Sverdrup, Peary's companion in 1892, led a party in the *Fram* up Smith Sound to explore the N. coast of Greenland, while in the same year Peary, with the help of Eskimo, followed the same route, and the Duke of Abruzzi on the Norwegian whaler *Jason* proceeded to Zemlya Frantseva-Iosifa. In 1900 various sledge parties were sent N., one, under Capt. Cagni, reaching a point 20 m. beyond Nansen's farthest N. The names of prin. note in the early 20th cent., notable for Peary's achievement in reaching the Pole, are those of Peary himself, Amundsen, Einar Mikkelsen, and Mylius-Erichsen. Peary undertook his last voyage in 1903, shortly before the time that Dr Frederick A. Cook claimed

to have reached the Pole. With a few whites, nearly 50 Eskimo, and 200 dogs he crossed the frozen seas, passing his own previous record of 87° 6' N. in 1906, and ultimately, on 6 April 1909, gained for the U.S.A. the honour of first reaching the Pole. The rapidity of Peary's travelling may be gauged from the fact that he traversed nearly 150 m. in 5 days going N., and on his return journey over 400 m. in 16 days. He located the Pole on a deep ice-covered ocean, there being no land in its vicinity, his soundings being 1500 fathoms within 5 m. of the Pole. The chief work of Mylius-Erichsen was the completion of the exploration of the hitherto unknown parts of the coast of Greenland from Kap Farvel, 60° N., for over 1600 m. to 83° N. He d. of cold and starvation after crossing the inland ice between Danmarks Fiord and Lambert Land in an effort to identify Peary's Navy Cliff. Mikkelsen, another Dane, recovered Erichsen's records for Denmark in 1912, and it is worthy of note that these records altered the entire cartography of N.E. Greenland, especially proving that Greenland extends over 20° eastward of Peary's farthest E., the net result being the addition of over 150,000 sq. m. to Greenland, and the discovery that the E. extremity of Greenland is within 23° of Spitzbergen. Other explorations of note are those of O. Sverdrup in Grinnell Land and his discovery of Axel Heiberg and Ringnes Is., the re-location in 1904-5 by the Norwegian Amundsen of the N. Magnetic Pole in 70° N. 97° W., and the investigations of the Eskimo of V. Stefánsson from 1908 to 1912. The great feat of Amundsen was the unquestioned accomplishment of the NW. passage over Franklin's route. Since the war, exploration and mapping of the Canadian Arctic, of the Arctic Ocean, and of Alaska has been organised by the Canadian and U.S. govs. on a large scale. Many scientific expeditions visit the Arctic, e.g. M. M. Miller's Juneau Icefield Research Project, 1944-52. See the *Polar Record* for accounts of expeditions.

A 'NE. passage' was only discovered in the late years of the 19th cent. After Nordenskjöld's journey in the *Vega* (1879), Vilkitzky's expedition in 2 ice-breakers in 1915 and Amundsen in the *Maud* in 1919-20 made the journey. Vilkitzky's boats brought back much valuable information on the Arctic coast of Siberia, and since then the Soviet Republic has sent out survey boats to the same region and has much developed the Northern Sea Route (q.v.). Amundsen's *Maud* tried to follow Nansen's former route across the Arctic Ocean, in the hope of drifting to the Pole; but the effort was not successful though the expedition which later was commanded by Wisting returned with much useful information about the Siberian coast supplementary to that of Vilkitzky. Peary remains the only explorer who has sledged to the Pole, but his reported finding of Croker Land in 85° N. lat. was not confirmed by Amundsen in his polar flight in 1926, nor by the Amer. explorer,

D. B. MacMillan, who explored Ellesmere and other is. during the period 1913-17. One good result of Peary's exploit has been to reconcile explorers to research rather than to spectacular discoveries. The Norwegian, K. Rasmussen, throughout the decade 1920-30 opened up a mine of knowledge on Greenland and the Eskimo, as also have E. Mikkelsen and J. P. and L. Koch.

The aeroplane was not at first an unqualified success for exploration work. Amundsen, however, though he failed to reach the Pole in 1925, showed that with sufficient petrol the feat could be accomplished, and in the following year Commander R. Byrd flew to the Pole from Spitzbergen and back, and Amundsen's dirigible *Norge* also crossed from the same base to Alaska. Amundsen was accompanied by Gen. Nobile, the lt. designer of the airship, but unfortunately the enthusiasm of Amundsen's adventurous spirit caused him to quarrel with Nobile over the allocation of the credit for the flight as between Italy and Norway, and the two parted. Later, however, when it was learned that Nobile was missing on his second flight, Amundsen generously joined in the flights organised for relief. Nobile was eventually rescued, but nothing further was ever heard of Amundsen.

In 1928 Capt. Sir Hubert Wilkins flew from Alaska to 'Dead Man's Is.' Spitzbergen. The flight lasted less than a day, and though no new land was discovered in the waters N. of Canada useful observations were made on meteorological and navigation conditions in that region. Later in the year Gen. Nobile made 3 flights in his dirigible *Italia*, and on the third reached the Pole, only to be wrecked off N.E. Land. Numerous expeditions were organised for relief by many nations, but the Soviet icebreaker *Krassin* was the first to reach the stranded party. Meanwhile Nobile had been taken off the ice by a Swedish aviator. Half the crew, however, perished, no trace of them or of the wrecked airship in which they had been carried away being found. With Amundsen, who, as stated above, joined in the relief expeditions, were 5 other men, who also disappeared.

In 1931 Gino Watkins (Cambridge Univ.) tried to organise an air route from the U.K. to Canada via Greenland, but lost his life while hunting in a kayak in Greenland (see F. Spencer Chapman, *Watkins's Last Expedition*, 1934). Another notable Brit. expedition, the Brit. North Greenland Expedition, 1952-4, was led by Commander C. J. W. Simpson, R.N., and explored Dronning Louise Land. Considerable progress in exploration and mapping has been made by the Dan. authorities since the 1920's. *Expéditions Polaires Françaises Missions P.-E. Victor* (q.v.) have been active in Greenland since 1948, as have Amer. gov. expeditions in the Thule dist. and elsewhere. In 1931-2 Prof. Ushakov, of the Soviet Union, explored Severnaya Zemlya, little-known is. N. of Cape Chelyuskin.

In Sept. 1936 the Fr. polar research ship, *Pourquoi Pas*, foundered off Iceland with the loss of all but 1 of its crew, and of the famous Fr. explorer, J.-B. Charcot (q.v.). In the same year a Soviet hydrographic expedition, on the icebreaker *Sedov*, mastered the new sea route in the region of Novosibirskiye Ostrova, investigated for the first time 40 years before by the Russian explorer, E. Toll. In 1937 the Soviet Gov. estab. a Russian polar station in the vicinity of the N. Pole, on the sea ice. Prof. Otto Schmidt, who headed a Soviet expedition in 1937-8, reported that the N. polar summer climate was considerably milder than was expected and even showed temps. above freezing-point; soundings in the Polar Sea had proved that it was more than 3000 ft. deeper than Nansen's researches had led them to expect. Post-war Soviet exploration has followed this pattern, and drifting stations on the sea ice have made valuable contributions to knowledge of the Arctic Ocean, discovering notably the Lomonosov Range (q.v.). Permanent stations have also been set up on all Soviet arctic is. See Sir John Ross, *A Voyage of Discovery, for exploring Baffin's Bay and a North-west Passage*, 1819; Sir E. Parry, *Journal of a Voyage for the Discovery of the North-west Passage*, 1819-1820 (and subsequent *Journals*, 1824-8); Sir John Franklin, *Narrative of Journey to the Shores of the Polar Sea*, 1819-22, 1823; Sir J. Barrow, *Voyages of Discovery and Research within the Arctic Regions*, 1846; J. Payer, *New Lands within the Arctic Circle*, 1876; A. H. Markham, *The Great Frozen Sea*, 1878; Duke of the Abruzzi, *On the Polar Star*, 1903; Sir M. Conway, *No Man's Land*, 1906; R. Amundsen, *The North-west Passage*, 1909, and *The First Flight Across the Arctic Ocean*, 1927; R. F. Peary, *The North Pole*, 1910; F. Nansen, *Hunting and Adventure in the Arctic*, 1925; K. Rasmussen, *Across Arctic America*, 1927; R. N. Rudmore Brown, *The Polar Regions*, 1927; R. E. Byrd, *Skyward*, 1928; F. Spencer Chapman, *Walkins's Last Expedition*, 1934; L. Brontman, *On the Top of the World: the Soviet Expedition to the North Pole*, 1937; H. P. Smolka, *40,000 against the Arctic*, 1937; A. Croft, *Polar Exploration*, 1939; R. J. Cyriax, *Sir John Franklin's Last Arctic Expedition*, 1939; V. Stefansson, *Ultima Thule: Further Mysteries of the Arctic*, 1942; J. Minsky, *To the Arctic*, 1949. Also the following periodicals: *Arctic* (Montreal); *Polar Record* (Cambridge); publs. of the Hakluyt Society (London) and of the Hudson's Bay Record Society (London).

Arctic Ocean is usually defined as the area of water within the Arctic Circle. It lies to the N. of Europe, Asia, and N. America, and communicates with the Atlantic by means of the wide sea between Norway and Greenland; Denmark Strait, between Greenland and Iceland; and Davis Strait, between Greenland and Brit. N. America. The only communication which it has with the Pacific is by means of Bering Strait. A relatively mild climate is found a long way inside the

Arctic Circle owing to the influence of the Gulf Stream off the coast of Norway, and, on the other hand, Arctic conditions are caused to exist far into the Atlantic by means of the Arctic currents, which flow through Davis Strait and along the E. coast of Greenland. The sea between Norway and Greenland belongs physiographically to the same basin as the A. O., as ridges between Greenland, Iceland, Farøe Is., and the N. of Scotland separate it from the Atlantic region. The region immediately at and around the N. Pole is covered with rough sea ice, whilst Peary found the depth of the water at



New York Times
GREENLANDERS HUNTING AMONG THE
ARCTIC ICEBERGS

the N. Pole itself to be more than 1500 fathoms. The whole ocean, in fact, is covered with sea ice, which varies in depth from 5 to 30 ft. The average depth of the sea ice, however, is about 10 ft. It is frozen together in winter but in the summer it is broken up into floes of varying size. Leads form in the ice pack, and when these leads close up again the floes are piled up on one another, and the well-known 'hummocky' ice results. If hummocky ice is piled up against a shallow shore and so fixed for a great length of time, the appearance is produced which Nares called the palaeocrystic sea. A permanent layer of fresh water is found in many places outside the edge of the ice pack. This layer, which has a depth of 6 ft in some places, is formed partly by the melted ice and partly from the outflow of the rivs. of Siberia. The sea ice as a whole has been found to drift from the middle of the N. coast of Siberia north-westwards towards the NE. extremity of Greenland. Large quantities of ice also pass down each year between Spitsbergen and Greenland. The warm surface waters of the Atlantic flow up into the Arctic regions, passing

between Greenland and Norway. When they arrive there they are chilled by contact with the icy Arctic waters, and gradually sink to the bottom. Finally they return, along the E. side of Greenland and down Davis Strait, as a cold current carrying with them the icebergs which are such a danger to navigation in the Atlantic. The above is only an adumbration of the circulatory system which exists. The winds, the Gulf Stream, and the various submarine ridges and depressions between the continents and is. are all factors which complicate the movements of the waters. The A. O. is bordered by a fairly broad continental shelf; this renders the ocean as a whole shallow. Along the N. of Europe and Siberia, to 135° E. long., the water is very shallow indeed, and proceeding westward from this point the depth does not exceed 80 fathoms. Between Zemlya Frantsa-Iosifa and Novaya Zemlya the depth of the water varies from 100 to 150 fathoms, and between Norway and Bjørnøya it is 240 fathoms. In the Kara Sea a depth of over 400 fathoms is found. The depth of the ocean E. of 135° long. suddenly increases to 2000 fathoms. The *Fram*, in 1893-6, drifted with the ice from 79° N. lat. and 138° E. long. into the neighbourhood of Spitsbergen, and the depth of the sea along her route was ascertained to be more than 1800 fathoms, and frequently over 2000 fathoms. The Nathorst expedition of 1898 found that the greatest depth W. of Spitsbergen was 1720 fathoms. The temp. of the A. O. is found to vary somewhat at different depths. The surface temp. in the polar regions is usually about the freezing-point of salt water, 29.2°. It increases at about 110 fathoms to 33°, and between 120 and 350 fathoms the temp. is higher than at any other depth, ranging between 35° and 39.9°. This warm layer is probably due to the influence of the Gulf Stream. Directly underneath this, down to nearly 1000 fathoms, there is a drop in the temp. to about 31.9°. Lastly, from 1000 fathoms to the bottom the water is slightly warmer, and the temp. is fairly uniform, being between 33.1° and 33.4°. Near the Pole itself there appears to be no wind in the winter, and the air is clear; in lower lat., round Zemlya Frantsa-Iosifa and Greenland, for instance, whilst the temp. is higher, rough winds prevail. These are generally SW. along the coast of Norway, and as far as Zemlya Frantsa-Iosifa, but W. of this region northeasterly winds are general. During the summer fogs and mists are very frequent, and form one of the greatest dangers to explorers. The prin. rvs. which flow into the A. O. are the Onega, the Dvina, and the Petchora in Europe, the Lena, the Yenisei, and the Obi in Asia, and the Mackenzie in America. The lofty Arctic lands are covered in the interior to an enormous depth with snow and ice, and vast glaciers are found in some places—for instance, the Humboldt Glacier on the W. coast of Greenland. The smaller seas and bays contained in the A. O., Baffin Bay, Bering Strait, Davis Strait, the

Greenland Sea, the Kara Sea, the White Sea, etc., are described at length in separate articles. Soviet scientists have contributed much to our knowledge of the hydrography of the A. O. since the estab. in 1937 of a series of drifting stations on the sea ice (see ARCTIC EXPLORATION). Amer. and Canadian gov. depts have also done much charting and oceanographical work in post-war years.

Arctiidae, family of lepidopterous insects; the tiger moths.

Arctinus, of Miletus, anct Gk epic poet, probably of the 8th cent. bc. His life is unknown. His works, which are said to have included the *Aithiopis*, a continuation of the *Iliad* and *The Sack of Troy*, are lost except for a few fragments, collected in Kinkel's *Epicorum Graecorum Fragmenta*, 1877.

Arctium, see BURDOCK.

Arctostaphylos, family Ericaceae, genus of evergreen shrubs. *A. uva-ursi*, the Bearberry, is native to Britain, N. Europe, N. Asia, and N. America; once cultivated for medicinal uses, and in tanning and dyeing. Amer. species of *A.*, grown in gardens, are often known as Manzanita.

Arcturus, or Alpha Boötis, next to Sirius the best-known star, and the brightest in the N. sidereal hemisphere. It is one of the 11 stars brighter than the first magnitude and the sixth brightest in the heavens, its magnitude being 0.3. *A.* derives its name from 2 Gk words, *arktos*, a bear, and *oura*, tail. It is not in the constellation called Ursa Major (Great Bear), but is nearly on a line drawn through the 2 hinder stars of the tail of the Bear. *A.* has been the subject of many literary references in anct and modern times, and perhaps one of the oldest references to it is contained in the book of Job in the Bible (Job ix. 9 and xxxviii. 32), though possibly here, as elsewhere, the name of *A.* is wrongly used for the constellation the Great Bear. Hesiod (q.v.) makes reference to *A.* in his *Works and Days*. The poet Shelley, in *The Question*, uses the word in the plural, singing of 'Daisies, those pearl'd Arcturi of the earth, the constellated flower that never sets.' Astronomically *A.* has many points of interest, not the least being that it is the fastest-moving of the brighter stars, its velocity being 84 m. a sec. Its 'proper motion' is 228" a cent., which is very high. *A.* is approaching the earth at the rate of about 4 m. a second. It will, however, take a long time to arrive, for its light, travelling at the rate of more than 186,000 m. a sec., takes about 40 years to reach us. In type the star resembles our sun, its spectrum being full of metallic lines, but it is 2000 times more luminous.

Arcueil, Fr. tn, a S. Industrial suburb of Paris, in the dept of Seine, on the R. Bièvre. There are remains of a Rom. aqueduct built by the Emperor Julian (*Arcus Iuliani*, hence the name *A.*). The lower part of the modern aqueduct was constructed in 1813 to bring water to the Luxembourg Palace (q.v.). Pop. 18,200.

Arey, Grotto of, cavity in a hill in the

dept of the Yonne, France, about 3 m. S. of Vermenton. It contains various apartments, in some of which are found stalactites and stalagmites. The cathedral of Auxerre is supposed to have been built of stone from this grotto.

Ard, loch in the SW. of Perthshire, Scotland.

Ardagh: 1. Vil. of co. Longford, Rep. of I., formerly the seat of the bishopric of A., which was founded by St. Patrick in the 5th cent. St. Mel was the first bishop. Pop. 1500.

2. Vil. of Limerick. *see* RATHKEALE.

Ardalan, *see* SANANDAJ.

Ardashir I (AD 224-40), King of Persia, founder of the dynasty of the Sasanians, was the son of Babak (Papak) and grandson of Sasan. Having reduced to submission the prov. of Fars, A. then defeated Artabanus IV (q.v.) in 3 successive battles in the last of which Artabanus was killed. A. entered Ctesiphon in triumph. A coalition formed to restore the rule of the Parthians was defeated, and all retired except the King of Armenia who continued the war for some ten years. War with the Romans broke out in 232. It ended after sev. defeats in the reoccupation by the Persians of Nisibis and Carrhae. A. retained the Parthian feudal system but introduced a greater degree of centralisation, and made the army into a powerful instrument for the execution of his policy. He made Zoroastrianism the state religion, and the chief Zoroastrian dignitary, the *mohadnan mobadh*, became one of the chief officials of the state (*see* A. Christensen, *L'Iran sous les Sassanides*, 1936).

Ardabil, dist. and tn of Azarbaijan, Persia, 180 m. NE. of Tabriz. In the 10th cent. A. was the cap. city of Azarbaijan. It was sacked by the Mongols in 1220, and became the cap. of Persia under the Safavids before they removed to Tabriz. Pop. of tn 5000.

Ardèche: 1. Fr. riv. rising in the Cévennes and flowing SE. to the Rhône. Length 70 m.

2. Dept of France, formerly part of the ant. prov. of Languedoc. It is very mountainous, containing part of the Cévennes (the Vivarais mts) in the W., and is watered in the SE. by the R.A. Cereals, vines, chestnuts, mushrooms, and olives are produced, and coal and iron are found. The prin. tns are Privas (the cap.), Largentière, and Tournon (qq.v.). Area 2140 sq. m. Pop. 249,100.

Ardee, tn of Louth, Rep. of I., on R. Dee. It contains a 13th-cent. church, and two 14th-cent. castles. Pop. 2492.

Ardemano, **Teodoro** (1664-1726), Sp. architect, painter, and sculptor, b. Madrid. He studied painting under Claudio Coello, and afterwards gave his time to mathematics and architecture. He painted the frescoes in the church of St. Francis, Madrid, and among his sculptures are the tombs of a dauphin of France and of a queen of Savoy. The cathedral of Granada is partly his work.

Arden, Forest of, dist. in central and W. Warwickshire, England, originally part of a forest which covered a large part of

the midlands. Undulating and still well wooded. It is probably the scene of Shakespeare's *As You Like It*. His mother claimed to belong to the famous Arden family, founded in the 11th cent.

Ardennes: 1. Formerly the name of a large hilly and wooded dist. embracing parts of Belgium, Germany, and France; now applied to the wooded heights which extend from SE. Belgium into France on each side of the Meuse. The highest elevations are about 2000 ft. The industries of the dist. are pasturage and mining. This hill and forest region, watered by the Meuse and Aisne, was the scene of heavy fighting in the early days of the First World War, the Ger. invading armies marching to SE. Belgium through Luxembourg in the S. Ardennes and through Malmédy near the N. part of the dist. The fate of Liège (Aug. 1914) cleared the road for the Germans between A. and Visé when, under the Duke of Württemberg and the crown prince, they resumed their advance by the hills to the Luxembourg railway lines. After the fall of Liège Gen. von Bülow, on the pretext that the inhab. of the tn of A. had attacked Ger. troops, ordered the tn to be burned and 100 inhab. shot. It was in the A. in the Second World War that Gen. von Rundstedt (q.v.) opened his counter-offensive on the Belgian and Luxembourg frontiers on 16 Dec. 1944. In the new year, on 3 Jan., the Americans launched a powerful counter-attack on the N. flank of the A. salient, which eliminated the last hostile threat and reduced the Germans finally to a general defensive. *See* WESTERN FRONT IN SECOND WORLD WAR.

2. Dept of NE. France, bordering on Belgium, formed of parts of the ant. provs. of Lorraine, Hainaut, and Champagne. It is partly wooded and hilly, and is watered by the Aisne and the Meuse. The W. and the riv. valleys are fertile, live-stock raising is important, and there are many iron-mines and quarries. Prin. tns are Mézières (the cap.), Rethel, Sedan, Vouziers (qq.v.). Area 2027 sq. m.; pop. 245,000.

Ardfert, tn in co. Kerry, Rep. of I. 5½ m. NW. of Tralee. It is the see of the Bishop of A. and Aghadoe, and the ruined cathedral is of 13th-cent. construction. A. Friary was founded by the Franciscans in 1253. Pop. of vil. 135.

Ardglass, small seaport, fishing station, and bathing resort in co. Down, N. Ireland. Pop. 500.

Ardil, textile fabric produced from groundnuts in the U.K. in 1944 and used in the manuf. of a cloth with wool-like qualities. *See* MAN-MADE FIBRES.

Ardilaun, **Arthur Edward Guinness**, 1st and only Baron (1840-1915). Educ. at Eton and Trinity College, Dublin. Head of the great brewing firm of Arthur Guinness & Co. Conservative M.P. for Dublin, 1868-9 and 1874-80. Raised to peerage, 1880. Acquired St. Stephen's Green (Dublin) and Muckross estate (Killarney) for the public.

Ardingly, vil. of Sussex, England, 40½ m. from London with a Woodard

public school. Wadehurst Place is a 16th-cent. mansion; St Peter's Church dates from the 14th cent. Pop. 1310.

Arditi, Luigi (1822-1903), It. musician and composer, b. Piedmont, graduated at Milan Conservatory 1842. In 1846 he visited Havana as violinist with Bottesini, the double-bass player, and in 1847 went to New York as conductor of the Havana Opera Company. In 1858 he became conductor of His Majesty's Theatre, London, being Patti's favourite conductor. He wrote some operas but is now remembered only for his light waltz song, *Il Bacio*. Pub. *Reminiscences*, 1896.

Ardluke, Eskimo name for the grampus.
Ardmore: 1. Vil. and watering-place of Waterford, Rep. of I., 6 m. from Youghal. Pop. 200.
2. Co. seat of Carter co., Oklahoma, U.S.A., home of the Chickasaw Indians, 98 m. N.E. of Fort Worth. It is a commercial, shipping, and manuf. centre in a rich agric. region. A state hospital and the Carter Seminary for Indians are here. Pop. 17,890.

Ardnamurchan Point, headland in Argyll, Scotland, the most westerly point of the mainland. The lighthouse on it was built in 1849.

Ardnaree, see BALLINA.

Ardobicum Curonium, see CORUÑA, LA.
Ardoch, vil. of Perthshire, Scotland, 9 m. S.W. of Crieff, containing the best-preserved Rom. camp in Great Britain. Pop. 985.

Ardoye (Flem. *Ardooie*), tn in the prov. of W. Flanders, Belgium. Pop. 7100. It is noted for its cloth-weaving works.

Ardres, Fr. tn in the dept of Pas-de-Calais, on the A. canal. The Field of the Cloth of Gold (q.v.) was at Balinghem, 2½ m. from A. Lace and tapestry are manuf., and a cattle market is held. There are ferruginous springs. Pop. 2900.

Ardrihaig, port of Argyll, Scotland, 19 m. S.W. of Inveraray, on Loch Gilp and the Crinan Canal. Pop. 1300.

Ardrossan, burgh and seaport of Ayrshire, Scotland, 12 m. S. of Largs on the Firth of Clyde. There is an important harbour, the construction of which was begun in 1806. The tn is noted for its shipbuilding and oil refinery, and there are collieries and ironworks in the neighbourhood. A ruined castle with its dungeon, known as Wallace's Larder, may still be seen. Pop. 8800.

Ardreea, par. in Tyrone and Londonderry cos., N. Ireland, containing part of Moneymore. Pop. 5000.

Arduini, Carlo (1815-81), It. author. He became a journalist at Rome, and after the fall of the rep. of Mazzini went to Switzerland and was appointed prof. of It. language and literature at the Polytechnic, Zürich. Among his works are a hist. of Picenum; *L'ultimo dei Romani, ovvero la congiura di Stefano Porcari*, an historical drama, 1849; a work on the philosophy of Dante and on literature and art during the It. Renaissance; and one on the philosophy of the fine arts in Italy.

Ardreck Castle, on the edge of Loch Assynt (q.v.), Scotland, built in the late 16th cent. and now ruined. The Marquess

of Montrose (q.v.) was imprisoned here (1650) before his execution.

Ardwick Series, geological name of series of marls and limestones which form part of the Upper Coal Measures in the S. Lancs coal-field of Britain.

Ardys succeeded his father Gyges as King of Lydia, and reigned 678-629 B.C. He took Priene, and made war on Miletus. The Cimmerians, attacked by the nomads of Scythia, invaded the kingdom of A. See Herodotus, i. 14, 15.

Are, unit of fr. land. A square measure, one side of which is 10 metres long. See METROLOGY.

Area, two-dimensional measurement of surface. The A. of a rectangular surface = length multiplied by breadth. The A. of a parallelogram = length multiplied by perpendicular height; the A. of a triangle = half the product of any side and the perpendicular drawn to it from the opposite angle; the A. of a circle = πr^2 , where $\pi = 3.1416$ (approximately) and r = radius (see CIRCLE and IT). See DIMENSIONS; MEASUREMENT AND SURVEYING; METROLOGY.

Areas of Local Government. Reference is made under local gov. (q.v.) to the fears of co. councils regarding the disintegration of co. areas which led to the appointment of the Onslow Commission in 1923 and the implementation of that commission's recommendations.

The movements of pop. during the Second World War created new problems of areas and boundaries, and the estab. of the Regional Commissioner system during the war gave rise to some apprehension that a regionalisation of local gov. might be adopted after the war. The Local Gov. Boundary Commission, set up in 1945, made widespread investigations and issued reports in 1947, 1948, and 1949, proposing the merger of certain co. councils, the div. of other cos., the constitution of one tier co. councils for certain conurbations, and the loss of the 'all-purpose' type of co. bor. status for some co. bors. The gov. dissolved the commission in 1949 and indicated that they intended to review the whole subject with a view to the introduction of a comprehensive scheme of reorganisation. In the autumn of 1956 the Minister of Housing and Local Gov. issued a white paper on 'Local Government—Areas and Status of Local Authorities in England and Wales,' after consultations with the sev. associations of local authorities. This only dealt with structures. It indicated that 2 commissions would be appointed to make recommendations. More co. bors., the only type of 'all purpose' authority, would be created, but the minimum pop. would be raised from 75,000 to 100,000. Small co. dists. would be absorbed into larger units and some co. councils would be amalgamated. Following a first new general review, the co. councils would review the areas of their co. dists., including, for the first time, the non-co. bors.

A new co. can only be created by the div. of an existing co. The Local Government Act, 1888, made provision for this

to be done by an order of the Minister of Health, now the Minister of Housing and Local Gov., confirmed by Parliament. Only in one instance has it been done, namely in the case of the Isle of Wight in 1889. For the creation of a new co. bor. an Act of Parliament is necessary, and a pop. of 75,000 is required.

Any dist. council may petition Her Majesty for the grant of a charter of incorporation as a bor. for the whole or any part of their area. A bor. council may make proposals for the alteration of the boundary of their bor. to the minister and he may make an order therefor subject to the approval of Parliament.

The creation of a new urb. dist., rural dist., or par., or the alteration of the boundaries thereof, may be effected in 3 ways. The local authority may make a proposal to the co. council and that council will hold a local inquiry and may make an order for the change and submit it to the minister for approval; secondly, the co. council may themselves make representations to the minister for the change; thirdly, the co. council may review the whole of the co. area and make a report to the minister with proposals for changes. If there is opposition to the scheme within 6 weeks of its pub., the minister must hold a local inquiry before deciding whether to make the order with or without modifications or not to make the order. The order must be laid before Parliament and may be annulled. There must be an interval of at least 10 years between these reviews. See also LOCAL GOVERNMENT.

Areca, family Palmaceae; genus of *Palms*, natives of Malacca to New Guinea. The chief species, *A. catechu*, is grown for its seeds, the pinang or betel nuts. See BETEL NUT PALM.

Arecibo, city on the N. coast of Puerto Rico, a processing centre in an agric. region (sugarcane, coffee, tobacco, fruit). It has sugar milling and alcohol and rum distilling, and manufs. needlework, clothing, furniture, and agric. machinery. It was settled in 1556. The harbour is dangerous. Near by are the famous caves of Consejo. Pop. 28,569.

Arena, central part of an amphitheatre where the fights of the gladiators and wild beasts were held. Its name was derived from the Lat. *arena*, sand, and it was so called because it was usually covered with sand.

Arenaceous (Lat. *arena*, sand) Rocks is a term applied to those rocks which are formed largely of sandy material. The fine particles of quartz, of which sand consists, mingle with particles of other material, such as mica or felspar, and when cemented become rocks. When the clayey cement predominates they pass into *argillaceous* rocks.

Arenaria, genus of Caryophyllaceae, about 160 species. *A. serpyllifolia*, Thyme-leaved Sandwort; *A. ciliata*, Irish Sandwort; *A. norvegica*, Norwegian Sandwort; and *A. gothica*, Fries' Sandwort, are found in Britain. *A. graminifolia* and *A. montana* may be grown in gardens.

Arenas, Puntas, see MAGALLANES.

Arenberg, former Ger. duchy, sovereign from 1644 until 1801, situated between Cologne and Jülich (qq.v.).

Arendal, seaport in S. Norway, co. tn of Aust-Agder, situated at the mouth of the R. Nid. Pop. 11,800. In the tn and neighbourhood are paper and wood-pulp factories and engineering and shipbuilding works.

Arendonk, tn in the prov. of Antwerp, Belgium, noted for its manufs. of hosiery. Pop. 8300.



Dr W. R. Waterfield

THE AREND-ROLAND COMET

Photograph taken with an astrographic camera. The straight line across indicates the passage of an aircraft.

Arend-Roland Comet, named after its discoverers, Prof. D. S. Arend and Georges Roland, both of the Belgian Royal Observatory, who first observed it in Nov. 1956. It approached within 53 million m. of the earth on 20 April 1957 and was first seen with the naked eye in Britain in April 1957. It is of the non-recurring type, its orbit being hyperbolic. See COMET.

Arène, Paul-Auguste (1843-96), Fr. writer, b. Sisteron. He helped Alphonse Daudet in his *Lettres de mon moulin*, 1868, and like him describes the life of his native Provence in many of his works. His chief novels are *Jean des Figues*, 1868, *La Guise*

parfumée, 1876, *La Chèvre d'or*, 1889, and *Domnine*, 1894. He also wrote comedies (*Les Comédiens errants*, 1873); short stories (*Contes de Paris et de Provence*, 1887); as well as many critical essays. See H. Provence, *Le Roman d'amour de Paul Arène*, 1945.

Arenenberg, castle on the borders of Lake Constance, canton of Thurgau, Switzerland. It was the residence of the Countess of Saint-Leu, ex-queen of Holland, and of Prince Louis Napoleon, afterwards Napoleon III.

Areng, name of one of the palms that produce sago and palm wine, found in all the is. of the Indian Archipelago. The only species, *A. saccharifera*, has a trunk 20 or 30 ft high covered with coarse black fibres. It yields a large amount of sap, which, when first drawn from the tree, is transparent. It soon becomes turbid and milky, and when fit for drinking is of a yellowish colour, with a large amount of astringency. It is very intoxicating. The coarse fibres are made into cables, and sago is obtained from the trunk.

Arenicola, see LUG-WORM.

Arensky, Anton Stepanovich (1861-1906), Russian composer, *b.* Novgorod. Studied under Zikhe, and, later, under Johansen and Rimsky-Korsakov at St Petersburg Conservatory. In 1890 his first opera, *A Dream on the Volga*, was successfully performed in Moscow. His other chief works are the opera *Nal and Damayanti* (1899), the ballet *A Night in Egypt*, and cantata *The Fountain of Bakheisarai*. He also composed church music, songs, symphonies, a set of variations for strings on a theme of Tchaikovsky, some chamber music, and a large amount of elegant piano music. Much of his output is already forgotten, for, though akin to Tchaikovsky's, his music lacks the dramatic eloquence, to say nothing of the versatile technical equipment, of the latter's.

Areolar Tissue, see CELLULAR.

Areometer, instrument for measuring the sp. gr. of fluids. See HYDROMETER.

Areopagus, 'the hill of Ares' (q.v.) in Athens, which gave its name to the judicial assembly of elders which met there. This was of great antiquity, and was said to have taken its name from the legend of Ares having been tried there by Poseidon for the murder of his son, Halirrhothius. Its powers and functions were greatly increased by Solon, 594 bc. It was formed of ex-archons and other men of high moral character, and exercised the right to inquire into men's incomes, to punish idleness and immorality, and to try persons for homicide, murderous assault, conspiracy, and arson. Its power declined after 487 bc; in 461 its jurisdiction was limited to homicide and certain religious cases; and it was finally abolished c. ad 400. For St Paul's sermon on the A. see Acts xvii.

Arequipa: 1. Coast dept of S. Peru, divided into 7 provs. Area 21,622 sq. m.; pop. 323,000. Mountainous region with fertile valleys. Agric., and rich in mineral resources. Chief exports are borax, textiles, and agric. products.

2. Cap. of A. dept and A. prov., trading and distributive centre. Tn founded by Pizarro on the site of old Inca city, 1539; pop. 130,000. A. stands at 7500 ft in a beautiful valley, but subject to earthquakes. Cathedral founded in 1612. It is a univ. tn with a public library and many fine colonial houses. Important textile centre. It is connected with its ports, Mollendo, 90 m. distant, and Matarani, 110 m., by the A.-Puno Railway. The tn was captured by the Chileans in 1883 during the war between Chile and Peru.

3. Volcano in A. dept, Peru, usually called El Misti; its altitude is 19,166 ft.

Ares, Gk god of war, later identified by the Romans with their god Mars (q.v.); son of Zeus and Hera. He loved Aphrodite, whose husband Hephaestus made the pair the laughing-stock of the gods. According to a late tradition A. slew Halirrhothius for violence to his daughter Alcippe, and was acquitted on the Areopagus by the Olympian gods, whence was derived the name Areopagus on whose W. slope was his temple. In the Trojan war he was wounded by Diomedes. The Aloadae also conquered him, and imprisoned him for 13 months. The worship of A. was not widespread in Greece. It was probably introduced from Thrac., derived perhaps from anet war magic.

Aretaeus (AD 81-1138), Gk physician, *b.* Cappadocia. As a clinician he ranks next in importance to Hippocrates. He left many fine descriptions of disease, including the first clear accounts of diabetes and sprue. His extant works were trans. by F. Adams, 1856.

Areata Cataracts, see ESSEQUIBO.

Arethusa: 1. Nymph; name of sev. fountains, the most famous being in Ortygia, near Syracuse.

2. One of the Hesperides (q.v.).

3. In botany, a genus of orchids.

Arethinian, see GUIDONIAN SYLLABLES.

Aretino, Leonardo, see BRUNI, LEONARDO.

Aretino, Pietro (1492-1556), It. poet and playwright, *b.* Arezzo, Tuscany; pretended to be the natural son of a nobleman. He wrote lyrics, satires, 4 unfinished epics, prose dialogues, and comedies. He also pub. some 3000 of his letters, which reveal much of 16th-cent. life, as well as his own vicious character, which won for him the name Scourge of Princes. After being banished from Arezzo he was patronised by Giovanni de' Medici, who introduced him to Francis I of France. His comedies are now regarded as his best work, but all his writings are tainted with licentiousness.

Aretino, Unico, see ACCOLTI, BERNARDO.

Aretinus, Guido, see GUIDO D'AREZZO. Ares was the son of Acrotatus, and succeeded his grandfather Cleomenes II as King of Sparta in 309 bc. He was attacked by Pyrrhus, King of Epirus, and was killed when engaged in battle in support of the Athenians against Antigonus Gonatas.

Aresu, or **Areas** (1st cent. bc), Gk philosopher of the Pythagorean school, *b.* Alexandria. He was one of the tutors

of the future Emperor Augustus, who, at his instance, spared the city of Alexandria in 31 BC.

Arezzo: 1. Prov. of Italy, in E. Tuscany (q.v.). It is in the Apennines (q.v.), and is mountainous except for the broad valley of the Arno (q.v.) in the W. (see CASENTINO). Cereals and wine are produced, and pigs are reared. The prin. tns include Arezzo, Cortona, and San Sepolcro (qq.v.). Area 1275 sq. m. Pop. 326,000.

2. (anct *Arretium*) It. tn, cap. of the prov. of Arezzo, near the confluence of the Arno and the Chiana, 36 m. SE. of Florence (q.v.). It was originally an Etruscan settlement (see ETRURIA), and in 308 BC it made a 30 years' peace treaty with Rome. In 283 BC it was besieged by the Senones (q.v.), and it was later colonised by Sulla (q.v.). During the Middle Ages it sided with the Ghibellines (see GUELPHS AND Ghibellines), partly out of enmity towards Florence (q.v.), by which A. was, however, defeated in 1289. In 1348 it came completely under Florentine domination. During the Second World War the tn suffered considerable damage. The anct part of A. stands on a hill, with the modern part at its foot. There is a 13th-cent. Gothic cathedral (20th-cent. facade) containing notable paintings. In the 14th-cent. church of S. Francesco there is a famous fresco by Piero della Francesca (q.v.) called the *Legend of the Holy Cross*. There are sev. other beautiful old churches, as well as palaces, museums, and a picture gallery. Twice yearly, in the *Piazza Grande*, there takes place a competition in which horsemen joust with a clockwork 'Saracen king.' The tn has a large trade in agric. produce, wine, and oil, and there are textile, leather, and pottery manufs. Maecenas, Vasari, Petrucci, Aretino, Caesalpino, and, perhaps, Guido d'Arezzo were natives. Pop. (tn) 28,000; (com.) 67,700.

Arlaks Mts. New Guinea (q.v.); highest elevation 9643 ft.

Arfe: 1. Enrique de A., distinguished Sp. silversmith, who lived in the early part of the 16th cent. He made the silver tabernacles of the cathedrals of Leon, Cordova, and Toledo, and also that of the Benedictine monastery of Sahagun.

2. Juan de A. y Villafino (1535-?), b. Leon, grandson of the above, employed by Philip II and Philip III. He was the artist of the tabernacles of Avila, Seville, and Osmas, and he made tabernacles for the cathedrals of Burgos and Valladolid, and for the church of St Martin at Madrid. He wrote *Guilador de Oro, Plata, y Piedras*, Valladolid, 1572, and *Varia Commensuración para la Escultura y Arquitectura*, Seville, 1585.

Arfredsonite, dark green mineral which occurs in igneous rocks such as nepheline-syenite and phonolite. Its formula is $\text{Na}_2(\text{Ca,Mg})_2(\text{Fe,Mn})_4(\text{Al,Fe})_2\text{Si}_5\text{O}_{18}$.

Argaeus, mt in Cappadocia, Asia Minor. Extinct volcano, 13,100 ft high. Now called Arjash-Daghi.

Argali, name of a species of wild sheep found in the steppes of Siberia and the mts of central Asia. It is the *Ovis ammon* of

Pallas. There are many races, which range from the Himalayas to Kamchatka. See SHEEP.

Argall, Sir Samuel (c. 1580-c. 1626), Eng. adventurer, b. Bristol. He went to Virginia in 1609 and obtained the release of sev. Englishmen held captive by Powhatan, a Potomac chief, by abducting his daughter, Pocahontas, in 1612. A. became Deputy-Governor of Virginia in 1617, resigning on account of charges of tyranny and rapacity in 1619. In 1621 he commanded a fleet against the Algerian pirates in the Mediterranean, and was knighted in 1622.

Argand, Aimé (1755-1803), b. Geneva, d. England, a chemist who first invented lamps with a burner which admitted air to the flame.

Argand Burner, burner for an oil lamp, in which the wick is in the form of a hollow cylinder, so that air rises within and without the flame, procuring more complete oxidation and therefore a brighter light. The addition of a cylindrical chimney creates a greater draught, at the same time promoting steadiness of the flame by preventing side draughts. The same principle is used in gas burners where the gas is admitted into the space between 2 hollow cylinders. This space is closed at the bottom and provided at the top with a series of small holes through which the gas issues.

Argao, tn on the E. coast of Cebu, Philippine Is. Founded 1608. Pop. 33,596. Products are rice, corn, and coco-nuts.

Argel, or **Arghel**, the *Solenostemma A.*, species of the family Asclepiadaceae found in Syria, Arabia, and Africa. Its leathery and acrid leaves are sometimes used in the adulteration of senna.

Argelander, Friedrich Wilhelm August (1799-1875), Ger. astronomer, b. Memel; educ. at the univ. of Königsberg. In 1820 became assistant to F. W. Bessel; was director of the observatory of Åbo, 1823, and later of Helsingfors, 1832. Appointed prof. of astronomy in the univ. of Bonn, 1837. In 1822 there appeared his treatise on the path of the great comet of 1811. His *Bonner Durchmusterung* includes all the stars of the N. hemisphere down to the eleventh magnitude.

Argelès-Gazost, Fr. spa, cap. of an arron., in the dept of Hautes-Pyrénées. Pop. 2300.

Argens, Jean Baptiste de Boyer, Marquis d' (1704-71). Fr. writer, b. Aix-en-Provence. He entered the army at the age of 15. Most of his writing was done at Amsterdam. He was invited to Potsdam by Frederick the Great in 1744 (see *Correspondance entre Frédéric II et le marquis d'Argens*, 1798). His chief works are *Lettres juives*, 1738-42; *Lettres chinoises*, 1739-42; *Lettres cabalistiques*, 1741; *Histoire de l'esprit humain* (14 vols.), 1765-8.

Argensola, Bartolomé Leonardo de (1562-1631). Sp. poet and historian. He studied at Saragossa and Salamanca, took holy orders, and was attached to the suite of the Count of Lemos. He pub. in 1609

Conquista de las Islas Molucas; and in 1630 a supplement to Zurita's *Anales de Aragón*; in 1634 his poems, which are highly polished, witty, and satirical, appeared with those of his brother. In 1613 he succeeded his brother Luperco as historiographer of Aragón.

Argensola, Luperco Leonardo de (1559-1613), Sp. dramatist and poet. His tragedy *Filís* is lost; *Isabela* and *Alejandra*, imitations of Seneca, were pub. in 1772. His poems, being trans. from Lat. poets and some original satires, were pub. with those of his brother in 1634. In 1585 he was appointed secretary to the Duke of Villahermosa, in 1599 he became historiographer of Aragón, and in 1610 he accompanied the Count of Lemos to Naples, where he d. 1613. See O. H. Green, *The Life and Works of Luperco Leonardo de Argensola*, 1927.

Argenson, Marc Antoine René de Voyer, Marquis de Paulmy d' (1722-87), Fr. diplomatist and man of letters, b. Valenciennes; son of René Louis de Voyer d'A. He collected the famous *Bibliothèque de l'Arsenal*, containing 150,000 vols., which was sold after his death to the Comte d'Artois. Pub. *Mélanges tirés d'une grande bibliothèque*, 1779-87.

Argenson, Pierre de Voyer, Vicomte d' (1626-70), fifth Governor-General of Canada (1658-61), educ. for the priesthood but forsook the Church for the Army. He came to Quebec in 1658, 1 year after his actual appointment. His tenure was marked by a dangerous attack on the Fr. establs. in Canada by the Iroquois, an attack which was checked by the heroism of the garrison at Long Sault under Dollard. A. returned to France in 1661 and rendered distinguished service in the royal armies. It was during his tenure that de Laval arrived in Quebec as first Bishop of Quebec and Canada.

Argenta, Jacopo Filippo d', It. miniaturist of the 15th cent. He did exquisite work in choir-books, specimens of which are still to be found in the communal library at Ferrara.

Argentan, Fr. tn in the dept of Orne. Horses are bred, and there is a school of lace-making and leather manufs. Mézeray (q.v.) was a native of A., and Charlotte Corday was b. at St Saturnin-des-Lignerets near by. The tn was severely damaged during the fighting in Normandy in 1944 (see FALAISE, *Battle of the 'Falaise Pocket'*). Pop. 6700.

Argentario, or Argentaro, It. mt. in Grosseto, S. Tuscany (q.v.), forming a peninsula jutting into the Tyrrhenian Sea. Orbetello is on the isthmus joining it to the mainland, and at its foot lie the harbours of Port'Ercole and Porto S. Stefano. Height 2082 ft.

Argentera, mt in Italy, near Cuneo (q.v.). It is the highest peak (10,817 ft) in the Maritime Alps (see ALPS).

Argenteuil, Fr. tn in the dept of Seine-et-Oise, on the Seine. It is a residential and industrial suburb of Paris. Héloïse (see ABELARD) was abbess of the convent here, founded in the 7th cent. The modern church preserves a relic, said to be the seamless tunic of Christ, given to the

convent by Charlemagne. There are aircraft, automobile, metallurgical, and textile manufs., and market gardening is important. Pop. 53,500.

Argenteus, Codex, or Silver Book, name of a MS. containing the greater part of the 4 gospels in the Moeso-Gothic language, now in the library at Upsala, Sweden. It was discovered in the Abbey of Werden, Westphalia, and is believed to be a relic of the Gothic Bible trans. by Ulfilas, who lived in the 4th cent. AD. The leaves are of vellum, the initial letters are in gold, and the others in silver. The Gothic gospels of the Silver Book were first printed in types approaching to a facsimile by Junius, 1665; in Stockholm, 1671; by Edward Lye at Oxford, 1750; and by Zahn, Weissensfels, 1855.

Argentières, glacier of Mont Blanc (q.v.).

Argentières Pass, pass in the Maritime Alps (q.v.), leading from Barcelonnette in the dept of Basses-Alpes (q.v.), France, to Dament in the prov. of Cuneo (q.v.), Italy.

Argentières, Fr. vil. in the dept of Haute-Savoie, 6 m. NE. of Chamionix. In the vicinity is the famous glacier of A., the largest in the Mont Blanc group.

Argentina (Lat. *argentum*, silver), deep-sea salmonoid fish with silvery scales, found mainly in the N. Atlantic down to 500 fathoms or so. Artificial pearls are made from the scales.

Argentina, or Argentine Republic, federal rep. of S. America; its name is derived from the Río de la Plata (riv. of silver). It is bounded on the W. by the Andean range of mts, which separates it from Chile; on the N. by Bolivia, and on the E. by Paraguay, Brazil, Uruguay, and the Atlantic Ocean. Area 1,084,359 sq. m. (including water surface).

The country is divided into provs. and ters. There are 19 provs. and 1 federal dist.: (1) In the N., Salta and Jujuy. (2) On the coast, Buenos Aires, Santa Fé, Entre Ríos, Corrientes. (3) The central provs. of Córdoba, San Luis, Santiago del Estero, and Tucumán. (4) The Andean provs. of La Rioja, Catamarca, San Juan, and Mendoza. The ters. were 10 in number: (1) Neuquén, Río Negro, Chubut, Patagonia, and Tierra del Fuego. (2) Pampa. (3) Misiones, Formosa, and Chaco in the N. (4) Military Zone, Comodoro Rivadavia. In 1955 Formosa, Neuquén, Chubut, Río Negro, and Patagonia became provs. There is also the federal dist. of Buenos Aires (71 sq. m.).

Physical features. The Andes form a continuous chain of mountainous highland, with an average height of 13,000 ft. S. of Buenos Aires there is an extensive mountainous range, the Sierra Ventana. The country is well watered, the prin. rivs. being the La Plata, Paraná, Uruguay, Río Negro, Chubut, and Gallegos. In the N. and E. there are fertile valleys, and wide tracts of lands which for agric. and pastoral purposes could hardly be surpassed. In Patagonia and to the centre there are vast plains known as pampas, which are covered with shingle and interspersed with clumps of thorny brushwood and tall thistles.

The climate for the most part is temperate and healthy, though that part of the country which lies N. of the tropic of Capricorn is extremely hot, and the S. ters. are bleak and windy. High, stormy winds, known as pamperos, blow on the coast from the Atlantic.

Products and industries. The main industries are agric., the pasturage of live-stock and forest products being 95 per cent of the whole. Wheat, oats, maize, and linseed are the prin. crops. Alfalfa, for feeding live-stock, is a very successful crop. Cotton, potatoes, sugar, vines,

are borax, salt, and limestone. Oil has now been found and the Argentine State Oilfields at Comodoro Rivadavia produce with private companies 4,200,000 metric tons annually.

Fauna. Numerous species of animals exist, of which may be named the chinchilla, fox, skunk, guanaco, coypu, viscacha, armadillo, deer, and ostrich. Birds of beautiful plumage abound, as, for example, parrots, flamingoes, and humming-birds. The extensive pasturage of live-stock has greatly decreased the numbers of wild cattle and horses.



Canadian Pacific

BUENOS AIRES, LOOKING TOWARDS THE HARBOUR

tobacco, rice, and yerba maté (Paraguayan tea) are also cultivated. Other products are peanuts and sunflower seed. The vine is cultivated in Mendoza and San Juan and the wine export to other S. Amer. states is increasing, being valued at £500,000 yearly. Meat-packing houses have been estab. on a large scale, and meat refrigeration is the chief industry. Flour-milling is next in importance. The A. has commerce with practically all the European countries and with the U.S.A., but the greater part of the trade is with Great Britain and France. The prin. exports are beef and mutton, wheat, maize and linseed, wool, skins and hides, tallow, sugar, spirits, dried fruits, and maté.

The minerals of the country might be much more developed than they have been in the past. Some gold is found in Patagonia and in the sub-Andean regions to the NW. Other minerals are silver, copper, lead, iron, coal, tin, and cement. Tungsten is an important mineral; others

Population (1955) estimated to be 19,111,500. A census taken in 1774 gives the Buenos Aires dist. pop. as 6000. In 1869, the year of the first regular census, it was 315,000. The pop. in 1955 was 3,582,561. The extraordinary increase in the past 60 years is explained by immigration. Of the tens of the Pampa, the ports have grown most rapidly: Rosario 465,000 (1952), Bahia Blanca 93,000 (1952). The areas of greatest density, however, remain the maize area in the Buenos Aires and Santa Fé provs., and the old agric. colonies on the Middle Salado. In 1914 foreigners numbered 30 per cent of the total pop., all being European except a few tens of thousands of Bolivians and a few thousand Brazilians and Chileans. Immigration is now more under control; in 1919 legislation was passed which requires intending immigrants to produce certificates of good character and ability to work. In 1954 immigrants numbered only 80,000; emigrants, 48,000. The general language

spoken is Spanish, but there are so many immigrants of different nationalities that there is a variety of languages spoken.

The national religion is Rom. Catholicism, but toleration is afforded to other religions.

The constitution is modelled on that of the U.S.A. The president, who must be a Rom. Catholic and a born citizen of the republic, is elected for 6 years, and is assisted by a vice-president and a Cabinet of 5 ministers. There is a Congress of 2 houses: the Senate, composed of 30 members elected by compulsory universal suffrage for 9 years, and the Chamber of Deputies, composed of 158 members elected for 4 years, one-half retiring every 2 years. There is also provincial self-gov., which is republican in form.

The army is a national militia, service in which is compulsory for all citizens between 20 and 45 years of age. After 10 years in the 'active' army, the men serve in the National Guard for 10 years and conclude with 5 years in the Territorial Guard, which latter is only mobilised in war. The army is organised in 6 divs. In 1952 the strength was about 105,000 men. The trained reserve numbered 300,000 men. The navy comprises 2 battleships, 5 cruisers, 6 frigates, 1 corvette, 4 coast defence ships, 11 destroyers, 3 submarines, and 14 mine-sweepers; and includes 9 motor torpedo boats, 27 landing craft, 7 oilers, 7 transport ships, 2 survey ships, and auxiliary vessels. Battleships and coastal defence ironclads have been modernised. There are 1500 naval officers and 20,000 men. The air force to-day comprises 9 reconnaissance groups and 3 fighting groups.

Education is compulsory for the ages of 6 to 14. Primary education is free, being subsidised by the General and Prov. Govs., and secular. Secondary education is also free, but not compulsory. It is controlled by the National Gov. in over 50 national colleges. Normal colleges, mining, agric., commercial, industrial, and training schools are also sustained at public cost. There are national univs. at Buenos Aires, and at Córdoba, which latter has an astronomical observatory. There are 5 prov. univs., the prin. being at Corrientes, Santa Fé, Tucumán, and La Plata. The Univ. of Cuyo for the provs. of Mendoza, San Luis, and San Juan was founded in 1921, and one at Bahía Blanca in 1955.

Chief towns. Buenos Aires, the cap. of the country, on the estuary of the La Plata, was founded by Don Pedro de Mendoza in 1535. It was made a bishopric in 1620, and a viceroyalty in 1775. It is an important commercial and educational centre and owns flourishing engineering works. Its pop. in 1905 was about 1 million. The prin. tns are: Buenos Aires, pop. 3,582,561; Rosario, 465,000; Córdoba, 352,000; Avellaneda, 100,000; La Plata, 218,000; Santa Fé, 168,000; Tucumán, 192,000; Bahía Blanca, 93,000; Mendoza, 93,000; Mar del Plata, 105,000; Santiago del Estero, 63,500.

Communications. The R.s Paraná and

Uruguay are important channels of trade. The railways now form part of the Argentine State Transport System, the Brit. company-owned systems having been taken over between 1946 and 1948. The 6 main systems have been renamed after important figures in the nation's hist. There are 26,700 m. of line, much of it on the 5 ft 6 in. gauge. There are now over 30,000 m. of telegraphs and over 50 wireless stations (1939), one of which is reserved for communications with England. Sov. aeroplane services are also in operation. There are tramway lines in all the important tns.

A. has produced a few great names in the realm of literature and science, Gregorio Funes (1749-1830), rector of the university of Córdoba, was an eminent historian. President Sarmiento, during his term of office (1868-74), founded the observatory at Córdoba. The first director of the observatory was Benjamin Apthorp Gould (1824-96), a scientist of the first rank, whose brilliant research work did much to kindle an interest in scientific matters. See further under SPANISH-AMERICAN LITERATURE.

By a law passed in 1899, the paper peso equals .44 of the gold peso. In 1956 the paper peso stood at 85.3 to £1. The revenue of the country is chiefly derived from customs and excise, which are heavy. All banks, national and prov., are now under the direct control of the State.

History. The country was first visited by Spaniards in 1516. A company of adventurers, under the leadership of Juan Díaz de Solís, landed near the Río de la Plata in search of a passage S.-westward to the E. Indies. In 1520 Magellan arrived at the wide estuary of the R. Paraná, and being convinced that there was no passage through to the W. he promptly left the country. In 1526 Sebastian Cabot, once a favourite of Henry VII of England, now the pilot-major of Charles of Spain, went to La Plata to make astronomical observations. On hearing of mineral wealth in the interior, however, he abandoned his primary object and began exploring. He explored up the R.s Paraná and Paraguay, built a fort on the Uruguay, and founded a settlement a little beyond the N. of R. Carcarañal, which he called San Espritu. The Indian ornaments of heavy silver which he sent home to Spain gave the country a reputation of great wealth, and the estuary of the Paraná was called the Río de la Plata, or the Silver R., in consequence. In 1534 a Basque nobleman, Pedro de Mendoza, organised an expedition on a larger scale than had been attempted before. He arrived at La Plata in the following year and laid the foundations of a Sp. settlement at Buenos Aires, but suffered great losses. His company of 2500 men was reduced to 500 in 2 years, partly from the repeated attacks of the Indians, and partly through the ravages of disease. Mendoza himself returned to Spain in 1537. His lieutenant, Domingo Martínez de Irala, remained in the country, and founded the

first permanent Sp. settlement in the interior of S. America at Asunción, which for many years remained H.Q. of the Sp. Gov. In 1538 Iralá was proclaimed by his fellow countrymen the captain-general of the Río de la Plata. The settlement at Buenos Aires had failed through the assaults on the colonists by neighbouring tribes of Indians. An attempt to re-establish the city was made in 1542 by Cabeza de Vaca, but with no success. In 1580 Juan de Garay, who in 1573 had founded the city of Santa Fé, rebuilt Buenos Aires, and endowed it with a corporation and full Sp. municipal rights. He defeated the Indians, and obtained complete mastery over them. By this time the Spaniards had penetrated as far as the Andes. Tucumán was founded 1565, and Córdoba 1573. In 1620 Buenos Aires became separate from the local Sp. Gov. at Asunción, though it remained under the authority of the viceroyalty of Peru. The colonists were very discontented under the yoke of the home gov. Spain jealously forbade all European powers to trade with her colonies or to settle in the country, which meant commercial ruin for the ports. In 1618 Spain allowed Buenos Aires to send out 2 ships, but the tn was prevented from having any internal trade with Peru by the exorbitant customs duty of 50 per cent levied at Córdoba on all goods sent to or from Buenos Aires. This duty was reduced in 1665, but it was not till 1776 that the policy of exclusion was finally abandoned. In 1713, by the treaty of Utrecht, England gained the right to import Negro slaves into Sp.-Amer. colonies. See ASIENTO.

The life of the early settlers, therefore, was not very prosperous. Not only was their trade crippled through the unwise administration of the mother country, but they themselves were continually harassed by attacks from the native Indians. In 1776 Buenos Aires was made the cap. and seat of the viceroyalty, with jurisdiction over the neighbouring ters. now known as the reps. of Paraguay, Uruguay, and Bolivia and the A. Federation. During the period of the Fr. Revolution Spain and France combined against Great Britain, and the Amer. colonies came in for a share of the warfare.

In 1806 Gen. Beresford besieged Buenos Aires, but was repulsed by the inhab., and in the following year Gen. Whitelock assaulted the tn and was also compelled to capitulate. The colonists were so elated at their victories, unaided by the Sp. or Fr. armies, that their thoughts inevitably turned towards independence. In the meantime Napoleon had entered Madrid, and proclaimed his brother, Joseph Bonaparte, King of Spain, and the colonists were not bound by any feelings of loyalty to the Fr. rule. On 25 May 1810 a provisional junta was formed, which marks the beginning of the rep. During the following 4 years the war of independence took place, Manuel Belgrano and José de San Martín being the 2 prominent revolutionary leaders. In 1816 a congress of deputies was held

at Tucumán, when Don Martín Pueyrredón was elected supreme dictator. Spain was defeated by the combined forces of Chile and Buenos Aires at Chacabuco in 1817, and at Maipú in 1818, but it was not till 1842 that Spain formally acknowledged the independence of the A. During the first half-cent. of the repub. the country was disturbed by continual civil war, due to the jealousy of the provs. of Buenos Aires and to the dissatisfaction of the remaining Sp. adherents. In 1826-8 war was waged with Brazil for the possession of Uruguay. The Brazilians were defeated at Utuzaingo, and Uruguay became independent under the name of Monte Video. In 1838-42 there was war with France; and in 1865-70 occurred the Brazilian-A. war against Paraguay, due largely to the arrogance of Francisco Solano Lopez, President of Paraguay, who had invaded A. ters. He was defeated and killed in 1870 by Mitre, the A. president and general, and peace was restored. Up to comparatively recent years the country was harassed by internal revolutions, which frequently involved a general financial crisis. Towards the end of the 19th cent. the relations between Chile and the A. were embarrassed by quarrels over the boundaries. The A. prepared for war by increasing its navy. The boundary protocol was signed with Chile in Dec. 1900. In the following year the 2 countries referred the question of the frontier to the arbitration of Great Britain, and in consequence war was averted. The death of President Manuel Quintana took place in Mar. 1906, when the vice-president José Figueroa Alcorta assumed presidential office. He was succeeded in 1910 by Roque Sáenz Peña, with Victoriano de la Plaza as vice-president.

Throughout the First World War A. remained neutral. One of the most significant events in A. hist. in these years was the election of the Radical leader, Dr Hipólito Irigoyen, to the office of president. Never previously had the Radicals secured control of the gov. in so proudly conservative a country as the A. During 1917 a serious railway strike, probably fomented by Ger. agitators, brought about acute political tension. Irigoyen's democratic sympathies were said to have indirectly encouraged the outbreak. About this time the notorious *spurs versenkt* warning as to Ger. U-boat intentions was sent to the A. Gov. and sev. A. boats were sunk. Feeling ran high in the A., but though numerous volunteers joined the allied armies, neutrality was preserved.

It is considered by most pan-Americans to be an outstanding achievement of the president that in spite of the strongest inducements from outside to join the Allies he kept A. out of the First World War. This abstention enabled the country to make headway in commerce, and in 1938 the foreign trade was valued at 2861 million pesos. Imports and exports were, respectively, 1461 million and 1400 million pesos. In domestic

affairs the chief features of Irigoyen's first administration were the introduction of a minimum wage to save the working classes from the effects of an inflated currency, the raising of the railway tariff, and the unswerving support of national and prov. constitutions. Irigoyen, who had been the chief political force in A. ever since he assumed a commanding position 40 years previously, at first refused to stand for the presidency, partly, perhaps, because he underestimated the chances of his party and partly because his immense estates occupied so much of his attention. He was, however, again inaugurated president in 1928, and but for the revolution of 1930 would in the ordinary course have held office till 1934. The most significant event in the foreign policy of A. in recent times is the unequivocal championship of the complete sovereignty of the S. Amer. reps., untrammelled by any implications or even by the mere existence of the Monroe doctrine. In 1930 a revolution took place, which ended the gov. of President Irigoyen. The *coup d'état* was effected by a combination of all the fighting services directed by a junta under Gen. Uriburu. The course of the revolution was swift and accompanied by relatively small loss of life and damage to property. The new gov., the members of which were all men of marked Conservative tendencies, dissolved Parliament but promised to respect the constitution. The cause of Dr Irigoyen's downfall was, apparently, popular discontent with one-man rule bordering on dictatorship, a discontent aggravated by economic depression, much the same causes as had led to similar forcible changes in the govts. of Bolivia and Peru a few weeks earlier in the same year. The *de facto* gov. estab. after the revolution of 1930 was succeeded by a constitutional régime in Feb. 1932, when Gen. Justo was made president in succession to Gen. Uriburu. In the interest of Brit. trade a Brit. Empire Exhibition was held at Buenos Aires in 1931, and was opened by the Prince of Wales (Edward VIII). President Castillo pursued a neutral policy in the Second World War. His policy was not unpopular in A., though in neighbouring countries it was construed as pro-Nazi. In June 1943 there was a military rising at the Campo de Mayo, the great A. military centre, and Dr Castillo surrendered to the revolutionaries and resigned the presidency. Gen. Ramírez, the insurgent leader, issued a manifesto, calling for 'a loyal Amer. union and collaboration, and the fulfilment of pacts and continental undertakings.' But one of the fundamental causes of the revolution is said to have been the alarm prevailing in A. military circles at the arming of A.'s neighbours, notably Brazil, while owing to Castillo's neutrality policy A. could not buy arms. Towards the end of 1943, however, relations between the Allies and A. greatly deteriorated on account of the openly Fascist character of the Ramírez dictatorship. In Jan. 1944 the A. Gov. announced the ending of diplomatic relations with Germany and

Japan, but despite the fact that the great majority of the people were democratic in sentiment and friendly to the Allies, the A. Gov. continued to tolerate widespread Ger. and Jap. espionage, and probably collaborated with the Germans in fostering unrest throughout S. America. Moreover relations between the Ramírez Gov. and Franco's Gov. in Spain continued to be as close as ever. But throughout most of the period from the revolution of June 1943 the A. Gov., partly under pressure of external events, had veered steadily towards the left—whence the frequent changes of presidents and ministers. The end of 1945 saw the rise of a 'Caudillo' in the person of Col. Juan Domingo Perón, who had been secretary of the War Ministry in June 1943, and since then secretary of labour and welfare, president of the Post-war Council, and finally vice-president of A. He was imprisoned by the dictatorship in the is. of Martín García, but owing to the insistent clamour of the A. workers was brought back to Buenos Aires as the *de facto* leader of the country. In the general election of Feb. 1946, which was held in an atmosphere of turbulence and violence, Perón was, in effect, the official candidate, and stood for the presidency as the self-proclaimed champion both of the masses against the plutocracy and of A. against the U.S.A. He had the support of part of the army and the allegiance of a large and well-trained police force. During the A. election campaign the Amer. Gov. pub. a memorandum, which it had addressed to the Pan-Amer. Union, in which evidence from Germany was adduced indicating a continuing partnership between the military dictatorship and an elaborate Nazi organisation in A., and quoting Perón himself as aiming at a 'thoroughly regimented totalitarian State dedicated to the pursuit of a warlike life and a war economy.' Perón's opponent was Dr Tamborini, a man devoid of Perón's glamour and mystic appeal, who had been minister of the interior from 1925 to 1928. Tamborini was the spokesman for all those who hated Perón, ranging from wealthy landowners and captains of industry to the workmen's leaders and left-wing agitators whom Perón had once imprisoned in the bleak wilds of Patagonia. He also represented his own party, the Radicals, and the democratic union of Socialists, Communists, and progressive democrats, though in A. party and programme count for far less than does a colourful and dynamic personality. The navy was opposed to Perón because it believed that soldiers should not rule, while the Catholic Church veered towards him on account of its disapproval of Socialists and Communists, and because the Radicals had included the principle of lay teaching in their programme. It was against all this strange and troubled background that Col. Perón was now making his bid for power, and in June (1946) he was inaugurated president amidst scenes of remarkable popular enthusiasm, particularly among his working-class supporters. After troubles in

the provs., especially in Catholic and conservative Córdoba, armed revolt broke out in the cap. in June 1955. This was supported by the naval and air forces, and in sufficient part by the army. By Sept. the provisional president Gen. Eduardo Lonardi had taken over from Perón, who had taken refuge on a Paraguayan gunboat. Rear-Adm. Rojas was a powerful aid. In Nov. Lonardi was replaced by Gen. Pedro Aramburu. The newspaper *La Prensa*, which had come under the control of Col. Perón, was restored to its rightful owners, with freedom of editorial action. The famous economist Raúl Prebisch was recalled from exile to advise on fiscal and monetary rehabilitation, and efforts were made to clear up the havoc wrought by years of maladministration.

Bibliography. W. H. Koebel, *Modern Argentina*, 1907, and *Argentina: Past and Present*, 1910; W. B. Parker, *Argentinian of To-day*, New York, 1920; C. R. Knock, *The Republics of Central and South America*, London, 1922, *Spanish America* (2 vols.), 1920, and *The New Argentina*, 1923; W. E. Browning, *The River Plate Republics*, 1928; F. A. Kirkpatrick, *A History of the Argentine Republic*, 1930; Ricardo Levene, *A History of Argentina*, 1938, and *Historia de la Nación Argentina*, Buenos Aires (10 vols.), 1942; J. Gunther, *Inside Latin America*, 1942; R. A. Ruiz y Ruiz, *Historia Civil Argentina*, Santa Fé (3 vols.), 1942; J. W. White, *Argentina: The Life Story of a Nation*, New York, 1942; Y. F. Rennie, *The Argentine Republic*, New York, 1945; P. E. James, *Latin America*, New York, 1946; G. I. Hankston, *Perón's Argentina*, 1953; Fleur Cowles, *Bloody Precedent, the Perón Story*, 1952; George Pendle, *Argentina*, 1955; F. Owen, *Perón*, 1957.

Argentite, or Silver Glance, mineral of the glauca group, occurring in isometric crystals. Consists of sulphur and silver, and is found in Cornwall, the Urals, and generally in N. European countries.

Argenton (-sur-Creuse), Fr. in the dept of Indre. It manufs. linen goods and shoes, and produces an excellent wine. Pop. 6100.

Arghei, see ARGEL.

Argillaceous (Gk *argillos*, clay) **Rocks**, term applied to those rocks which are formed entirely or partially of clay (q.v.).

Argillite, see PORCELLANITE.

Argo, or the **Ship**, largest of Ptolemy's 15 S. constellations. It is so large that much confusion formerly prevailed as to the names of its different parts. To obviate this difficulty Sir John Herschel suggested its div. into Carina, the Keel; Puppis, the Stern; Vela, the Sails; and Malus, the Mast. A part of Malus was called by Lacaille Pyxis, the Compass. The greater part of the constellation, which lies E. of Columba and Canis Major, is not visible in Britain, and it is this part which contains all the more important stars. Canopus is the only star in A. of the first magnitude, but at least 2 new stars temporarily outshone it. The variable star Eta Carinae was brighter than Canopus in 1843. It rapidly declined in luminosity, and it now fluctuates

slightly around a magnitude of 7.5. The constellation was named after the ship *Argo*, which conveyed Jason and his companions to Colchis, the story of which is told in the article ARGONAUTS. The Hindus regarded it as the ship of the sun, while the Egyptians regarded it as the bark of the moon.

Argol, crude product deposited on the bottom of a cask during alcoholic fermentation. It is used for the preparation of 'cream of tartar' and tartaric acid. The A. is partially purified by recrystallisation from hot water, is dissolved in water and boiled with chalk, when calcium tartrate, $\text{CaC}_4\text{H}_4\text{O}_6$, is precipitated. After washing, the tartrate is treated with sulphuric acid, which sets free the tartaric acid. A. is also a Mongolian term for dried dung used as a fuel.

Argolis, ter. of Peloponnesus (q.v.), of which Argos (q.v.) was the cap.

Argon (Gk 'inactive'), gaseous constituent of the atmosphere. Symbol A, atomic number 18, atomic weight 39.94. Up to 1894 it was generally assumed that the atmosphere contained oxygen and nitrogen, with variable quantities of carbon dioxide, hydrogen, water-vapour, ammonia, etc. It is true that Cavendish had in 1785 suggested the existence of a small proportion of another constituent, but little notice was taken of the suggestion until Lord Rayleigh and Sir Wm Ramsay demonstrated the existence of A. in 1894. Cavendish had added excess of oxygen to air and passed electric sparks through the mixture collected over caustic potash, so that nitrous acid was produced and absorbed. He then absorbed the excess of oxygen with 'liver of sulphur', and found a small bubble of unabsorbable gas remaining. Over 100 years later Lord Rayleigh determined with great care the weight of 1 litre of oxygen, of hydrogen, and of nitrogen. The results obtained in connection with atmospheric nitrogen were consistent one with the other, but when nitrogen prepared from ammonia was used, an unexplainable error of about one-half per cent was encountered. In 1894 Rayleigh and Ramsay in association proved that the difference was due to the presence in the atmosphere of an inert gas heavier than nitrogen.

A. may be prepared from atmospheric nitrogen in 3 ways: (1) by passing it over red-hot turnings of magnesium; (2) by sparking the gas with excess of oxygen in the presence of caustic alkali; or (3) by dissolving the more soluble A. in water. Commercially it is obtained by the practical distillation of liquid air.

As its name implies, A. is an inactive gas. Its density ($H=1$) is 19.82. It has been condensed to a colourless liquid which boils at -187° and freezes at -189.6° . It is largely employed in filling gas-filled electric filament lamps. See INERT GASES.

Argonautidae, family of cephalopodous molluscs of the order Dibranchiata and div. Octopoda. They are cuttle-fish, the males of which are very small, and the females, which are much longer,

bear a thin shell to hold their eggs. *Argonauta argo*, the paper-nautilus, or paper-sailor, is found in the Mediterranean; *A. tuberculata* in the Indian Ocean.

Argonauts (Gk 'sailors of the *Argo*'), heroes who accompanied Jason in his quest of the Golden Fleece. Aeson, King of Iolcus in Thessaly, was deprived of his kingdom by his half-brother Pelias. His son Jason, when grown up, demanded the throne, which Pelias promised to surrender if Jason would bring the Golden Fleece from Colchis, where it was guarded night and day by a dragon, in the oak grove of Ares. Jason ordered Argus to provide him with a ship with 50 oars, the building of which was superintended by Athena. It was called *Argo*, after its maker. Jason embarked with the great heroes of the age, e.g. Castor and Pollux, Hercules, Theseus, and Orpheus. Aesculapius was their physician, Tiphys the pilot. Their number is variously given as 45, 50, and 54.

Landing first at Lemnos, an is. inhabited by women who had murdered their husbands, they remained 2 years, and raised a new race of men called Minyae. They next visited Samothrace and Bebrycia, whence they were driven by a storm to Salmydessus, and delivered the land from the Harpies.

After many adventures they came to Aea, the cap. of Colchis. The king, Aëtes, promised to give up the Golden Fleece if Jason would yoke 2 fire-breathing bulls with brazen feet to a plough and sow the teeth of the dragon which Cadmus had not used at Thebes. This Jason accomplished by the help of Medea, the king's daughter, who loved him. She provided him with the means of resisting fire and steel, and a drug which lulled to sleep the dragon that guarded the Golden Fleece. The A. fled with their spoil, taking Medea with them, and were pursued by Aëtes. To hinder her father in his pursuit, Medea seized her brother Absyrtus and strewed the way with his mangled limbs. Zeus, angry at the murder of Absyrtus, raised a storm which drove the *Argo* to the is. of Circe, who refused to absolve Jason.

The A. continued their journey and were guarded through the straits of Charybdis and Scylla by Tethys, the mistress of Peleus, one of their company. They sailed safely past the Sirens, who sang in vain, for Orpheus surpassed them. At the is. of the Phaeacians they encountered King Aëtes and his fleet. The wife of Alcinous, king of the country, was chosen to arbitrate between the Colchians and the A. Secretly by night she had a marriage consummated between Jason and Medea, and in the morning declared that Aëtes's claim to his daughter was void.

After many disasters the *Argo* arrived in the Peloponnesus, where Jason was purified of the murder of Absyrtus, and finally reached Thessaly in safety.

The belief of many scholars that the legend is founded upon fact has been strengthened by some important excavations at Iolcus in the summer of 1956.

See J. R. Bacon, *Voyage of the Argonauts*, 1925.

Argonne, forest and hilly dist. of France in the anct provs. of Lorraine and Champagne. It is included in the depts of Meuse, Marne, and Ardennes. Its chief tns are Ste. Ménehould (the anct cap.), Clermont, Varennes, Beaumont, and Grandpré.

During the First World War the A. was the scene of bitter fighting against the forces under the Ger. crown prince, whose advance in Sept. 1914 was finally stopped by Gen. Serrail. In July 1915 the crown prince unexpectedly advanced his lines a quarter of a mile against superior odds, but was then halted by the French. During the stalemate that followed, the Germans constructed their Kriemhilde system of trenches as a continuation of the Hindenburg line, and profiting by the terrain built cement 'pill-boxes' for machine-guns over the entire section of the A. which they held. This stalemate was finally broken in the autumn of 1918, and in the battle that followed more Amer. troops were engaged than had ever fought under the Stars and Stripes at one time in any of the nation's previous wars. Twenty-two Amer. divs. were engaged, with a total strength of over 625,000 men. The importance of this battle was that it was calculated to bring the strongest pressure to bear upon the Germans at this point at the moment when Gen. Halg was hammering away successfully at the Hindenburg line. If the Amer. and Fr. troops, who were also engaged in this action, should succeed in piercing the A., they would threaten one of the most important series of railway lines upon which the Ger. armies depended not only for supplies and reinforcements but also for withdrawal in case of defeat.

The objective set the Americans was to pierce the Forest of A. and advance upon the W. bank of the Meuse, at the same time that the French, under Gouraud, advanced W. of the A. The thrust was so dangerous that, hard-pressed as Ludendorff was all along the line, he had to throw in troops sorely needed elsewhere. The Amer. attack opened with great élan on 26 Sept., on a front of 18 m., and, by the second day, Montfaucon, dominating a great stretch of country, had been taken.

On 4 Oct. the advance was once more resumed through what the Germans considered to be an impregnable forest. By 14 Oct. the Americans had captured Romagne, had broken through the Kriemhilde line at various places, and were approaching the partially completed Freya line. Gen. Pershing now divided his forces into 2 armies, the First under Gen. Liggett and the Second under Gen. Bullard (q.v.). In each of these there were Fr. as well as Amer. corps. By 2 Nov. the whole of the A. was cleared, the troops had passed through the Freya line and had reached Buzancy. According to the plan agreed upon between Marshal Foch and Gen. Pershing the troops were to push on to Sedan and cut the important railway network. By 6 Nov. Fr. and Amer. troops had reached the suburbs of

Sedan. Just as in the war of 1870 the Germans had trapped an entire Fr. army there, so now it seemed as if the French and Americans would turn the tables on the Germans. The latter, indeed, were only saved by the Armistice of 11 Nov. The Amer. casualties in this long-fought battle were 115,529, of which number 15,599 were killed.

Argos, anct city of Peloponnesus. In the Homeric age it was overshadowed by Mycenae, but during the reign of Pheidon (q.v.) its supremacy extended over the whole of the E. Peloponnesus. Engaged in frequent wars with Sparta; 461 BC, alliance with Athens; 229 BC, governed by tyrants supported by Macedon; 146 BC, subjugated by Rome; AD 1210, captured by the Franks. During the 18th cent. the scene of many conflicts between the Venetians and Turks. Archaeological excavations have brought to light the Heraeum, or temple of Hera, neolithic pottery, etc.

Argostoli, cap. of Cephalonia, one of the Ionian Is. Pop. 8200. See of the Gk Church. The tn has a fine quay and harbour. There is a curious stream flowing from the sea, which is used to drive mills. Currants, wine, and olive oil are exported. The ruins of the anct Cranii still remain.

Argosy, large ship either for merchandise or war. According to Rycout in *Maxims of Turkish Polity*, chap. xiv, it derived its name from Ragosies, i.e. the ships of Ragusa, but it is more probable that the A. derived its name from the ship *Argo* (q.v.).

Argot, see SLANG.

Argovie, see AARGAU.

Arguin, small Fr. is. off Cape Blanco, Africa. A. Bank is very dangerous for ships, and was the scene of the wreck of the *Medusa*, 1816. A. has been occupied at various times by Portuguese, Dutch, English, and French. Turtle fishing is the main industry, and gum arabic is produced.

Argument: 1. In logic, the middle term in a syllogism.

2. In mathematics, the angle, arc, or other variable quantity upon which the required quantities are made to depend.

3. Term used in astronomy, chiefly to denote the arc measured from the ascending node of a planet, comet, satellite, or any other body in the solar system to its perihelion point. This arc is always measured in the direction in which the body is moving with reference to its primary, i.e. with reference to the sun in the case of a planet or comet and with reference to a planet in the case of its satellite. In these cases it is known as 'the argument of perihelion' and is denoted by the symbol ω .

Argun, riv. in Asia. It rises in the Great Khingan Mts. W. Manchuria, and flows NNE., forming the boundary between Russia and China and joining the Shilka to form the Amur. Length, 440 m.

Argus, mythical son of Arestor, surnamed Pandotes, All-seeing, because he had 100 eyes, of which only 2 slept at a

time. Hera made him guardian of Io (q.v.). Zeus commanded Hermes to lull him to sleep with his flute and kill him. Hera transplanted his eyes to the tail of the peacock.

'Argus,' The, Melbourne, Australian daily morning newspaper estab. 1846, with wide coverage throughout the state of Victoria and Riverina dists. of New South Wales. Politically independent, with staffs in Canberra, Sydney, London, New York, and Paris, and correspondents throughout the world, it brings readers a wide and up-to-the-minute picture of international affairs.

Argus Pheasant, *Argusianus argus*, galliform bird, so called because its long tail-feathers bear ocellated spots. It is a native of the Malay Peninsula and Sumatra.

Argyll, maritime co. in W. Scotland, bounded W. by the Atlantic, N. by Inverness, E. by Perth, Dunbarton, Renfrew, and Ayr, and S. by Bute. A. was the original Scottish kingdom, founded c. AD 500 by the tribe of the Scots who named it Dalriada. The coast is heavily indented, and inland the co. is mountainous. Rainfall is high, ranging from c. 45 in. per annum in the SW. to over 120 in. in the NE. The Inner Hebrides, comprising Mull, Islay, Jura, Tiree, Coll, Colonsay, Iona, and Staffa (qq.v.), and other small islands, are included in the co. The highest peaks are Bidean nam Bian (3766 ft) and Ben Cruachan (3689 ft). The prin. sea-lochs are Sunart, Linnhe, Fyne, and Long, and the fresh-water Loch Awe is the largest inland lake. The Awe and Orchy rivs. are short and rapid. There are many beautiful glens, such as Glens Etive, Strae, Orchy, and Glencoe (notorious for the massacre in 1692). The co. abounds in deer and game; mountaineering, yachting, fishing, ski-ing, deerstalking, and camping are favoured recreations. The prin. industries are agriculture, tourism, forestry, fishing, distilling, and quarrying. Coal is mined near Campbelltown, and there are aluminium works at Kinlochleven. Whisky is distilled in Islay, Campbelltown, and Oban. Oban also manufs. tweed. Boat-building is carried on at Tarbert and Sandbank. In addition there is a seaweed processing industry, and slate, granite, and limestone are quarried. The Forestry Commission holds 384 sq. m. of the co. (116 sq. m. already under forest). A. is the largest sheep-producing co. in Scotland; much stock-rearing is carried on, and there is dairy-farming in Kintyre. Inveraray is the co. tn and seat of the Duke of Argyll who is head of Clan Campbell. The co. returns one member to Parliament. Area 3110 sq. m. (814 sq. m. being island); pop. 63,360.

Argyll, Dukes of. The dukes of A. are descended from the Campbells of Lochaw, who were created barons with the title of Baron Campbell. The earldom was created in 1457 by James I, who conferred it on Lord Campbell (d. 1493), from whom the greatness of the family dates. The 2nd earl was killed at

Flodden, the 3rd earl *d.* in 1530, whilst the 4th earl was the first of the great Scottish nobility to become Protestant. The 5th earl was one of the 'lords of the congregation,' but is later found on the side of Mary Queen of Scots, whose troops he commanded at the battle of Langside. After her defeat he again became friendly with the regent Murray, and ultimately became lord high chancellor of Scotland. He *d.* in 1573. He was succeeded by his half-brother, who *d.* in 1584, and his successor became a Catholic and fought for Philip III.

Archibald Campbell, 8th earl and 1st marquess, *b.* 1598 and succeeded to the control of the estates at an early age. He was thoroughly despotic and was described as the most powerful subject in the kingdom, being at the head of 20,000 retainers. He opposed the church policy of the king (Charles I) in Scotland. He became exceedingly powerful, and in 1640 the king was practically forced to create him a marquess. An attempt was made to kidnap him with 2 other Scottish leaders—the 'Incident' in 1641. He was instrumental in the completion of the alliance between the Parliament and the Scots in 1643. He defeated sev. royalist risings in Scotland; fought a campaign against Montrose in Argyllshire. He was defeated by Montrose at Inverlochy, and also witnessed the victory at Kilsyth. He negotiated with the king after the surrender at Newark, and attempted to moderate the parl. terms. He lost power when the king was beheaded, and although he supported Charles II in his attempt to regain the crown, his power passed to the Hamilton family. For complicity in parl. plots he was executed in 1661. *See* life by J. Willcock, 1903.

Archibald Campbell, 9th earl and 2nd marquess of A., eldest son of the 8th earl and 1st marquess of A., fought at Dunbar on the royalist side. Was omitted from the Act of Grace of 1654, and, although he submitted, was a prisoner from 1657 to 1660. He was raised to favour and high position by Charles II. He refused to sign the new test in 1680, making a special reservation, and was tried for treason and condemned to death 1681. He escaped to Holland, and there agreed to the Monmouth plot, and, crossing to Scotland, tried to raise the Campbells. He failed, and he was captured and beheaded on the old charge of treason 1685.

Archibald Campbell, 1st duke, *d.* 1703, was an active promoter of the revolution of 1688. He organised the massacre of Glencoe, 1692. In 1701 he was created 1st duke.

John Campbell, 2nd duke, one of the great founders of the union of Scotland and England. His services in this respect were recognised by the bestowal of the title of earl of Greenwich. He was a famous soldier, and fought at Oudenarde. Later in the war he took command in Spain. He was deprived of his offices on his return for his outspoken criticism of the ministry. Restored to favour under George I, he was instrumental in putting

down the '15 with so little bloodshed. He *d.* in 1743.

George John Douglas Campbell, 8th duke, *b.* 1823, succeeded his father in 1847. He became a well-known Liberal politician and held sev. ministerial posts. He resigned office (lord privy seal) in 1881 on the question of an Irish Land Bill. He was also an opponent of Irish Home Rule. He *d.* in 1900.

John Douglas Sutherland Campbell, 9th duke, succeeded his father 1900. He married in 1871 H.R.H. the Princess Louise. He was Governor-General of Canada 1878-83. He *d.* in 1914.

Ian Douglas Campbell, 11th duke, succeeded to the title after the death of the 10th duke in 1949.

Argyll and Sutherland Highlanders, The (Princess Louise's). This regiment, which combines the former 91st (Argyll) and 93rd (Sutherland) Foot, raised respectively in 1794 and 1799, was augmented to 27 battalions in the First World War. Its death-roll in the war was 6442. In the heavy fighting round Zonnebeke and Ypres in 1914 the regiment suffered tragic losses near Fromelles (2nd Batt.). It was also conspicuous in the Ypres battles of 1915 (7th Batt.) and at Loos (2nd Batt.). The 1st Batt. was at Salonica in 1916, and in that year the 2nd, 6th, 8th, 10th, and 11th Batts. were all engaged in severe fighting in the Somme battles, notably at Martinpuich and Delville Wood; at Arras in 1917 the 11th Batt. suffered losses, and other battalions were distinguished for their fine resistance at the Hoelx Chemical Works near the Menin Road (May 1917) and especially in the Vaux-Vraumont sector in 1918 (14th Batt.). The battle honours before the First World War included the Cape of Good Hope (1806), sev. battles of the Peninsular war, S. Africa (1846-7, 1851-3), the Crimea, Indian Mutiny, S. Africa (1879), and the Modder R. and Paardeberg. In 1930 H.R.H. Princess Louise became colonel-in-chief of the allied A. & S. H. of Canada. In the Second World War the regiment fought in the Libyan battles, and against the Germans in Greece and NW. Europe. Units of the regiment bore the brunt of some of the heaviest fighting in the Malayan peninsula (1941-2). They entered this battlefield over 800 strong; but after fighting a rearguard action down the entire peninsula they crossed over to Singapore Is. with fewer than 100 men, and these were the last to cross the causeway from Johore to Singapore.

A battalion of the regiment served in Korea.

See Brig.-Gen. A. E. J. Cavendish, *The 93rd Sutherland Highlanders, 1799-1927*, 1928.

Argyrokastro (Albanian *Gjinokastër*), tn in Albania, situated in the valley of the Drino, a branch of the Vjose. It contains a castle, a mosque, and barracks. Taken by Ali Pasha in 1812, it was afterwards surrendered to the Turks. Pop. 11,733. The scene of heavy fighting between the Italians and Greeks in 1941. (*See* WAR, SECOND WORLD, *Fall of Greece*).

Argyropoulos, John (c. 1418-86), Gk

scholar, b. Constantinople. Appointed rector of Padua Univ. about 1435, he returned to his native city in 1441, but died once more to Italy when Constantinople fell to the Turks in 1453. About 1466 he became prof. of Greek in the univ. of Florence and remained there until 1471, when he moved to Rome. Politian and Reuchlin were among his pupils. A. trans. sev. works of Aristotle.

Ari Thorgilsson (1067-1148), commonly called the Learned, Icelandic priest justly described as 'the Father of Icelandic historiography,' being the first to write hist. in the vernacular. His famous *Íslendingabók* (Book of the Icelanders) is a concise survey of the essentials of Icelandic hist. from the beginning down to 1120. The main body of the work is divided into ten chapters: (1) Of the settlement of Iceland. (2) Of the settlers and legislation. (3) Of the estab. of the Althing. (4) Of the calendar (explaining the reform of the Icelandic calendar made in the 10th cent.). (5) Of the div. (of the country) into quarters (for administrative purposes). (6) Of the settlement of Greenland. (7) Of how Christianity came to Iceland. (8) Of foreign bishops. (9 and 10) Of the first native bishops. For almost every statement Ari quotes his source, and such is his accuracy that no statement of his has ever been challenged. Snorri Sturluson (q.v.) pays him a tribute in his preface to *Heimskringla*. In consultation with Sæmundur Sigfusson (q.v.) Ari settled the chronology of the early hist. of Iceland. There are reasons to believe that he may have laid the foundations of the *Landnámabók* (q.v.) and other historical works, but of this we have no absolute proof. Of *Íslendingabók* there is a model Eng. trans. with an introduction by H. Hermannsson (q.v.).

Aria, one of the E. provs. of the ant. Persian empire, forming a part of Ariana (q.v.). It was bounded on the N. by Margiana and Bactriana, on the E. by the Paropamisadae, on the S. by Carmania, and on the W. by Parthia. It was the site of the modern Seistan and the S. part of Khorasan.

Aria, literally 'air,' denoting a rhythmic song as contradistinguished from a recitative, and in the 18th cent. came to imply a vocal piece in 3 sections, of which the third repeats the first, while the second introduces variety of subject-matter, key, and mood, known more exactly as the *da capo* aria. The development of the A. is closely bound up with that of the lt. school of music, as the great medium of vocal display. In principle it existed as early as Monteverdi's *Arianna* (1608) and reaches its more elaborate form in Alessandro Scarlatti and Handel. After Handel's death (1759) and Mozart's youth (1760's) less rigid forms developed, sometimes based on sonata form (Mozart), and later shaped by the dramatic action of an opera (Beethoven, Weber) or oratorio (Mendelssohn). Modern composers using the A. (e.g. Stravinsky) do so as an exercise in archaic formality.

Ariadne, daughter of Minos of Crete by

Pasiphaë, who loved Theseus and gave him the thread by which he escaped from the labyrinth after killing the Minotaur. He married her, but deserted her in Naxos, whence Dionysus carried her off to Zennos and set the crown he gave her among the stars. See J. Pendlebury, *The Archaeology of Crete*, 1939, and L. Cottrell, *The Bull of Minos*, 1955.

Ariana, general name given to the E. provs. of the ant. Persian empire, stretching from Media to the Indus, and bounded on the N. by the Indian Caucasus and on the S. by the Arabian Sea.

Ariana (ant. *Aequum Tuticum*), It. tn in Campania (q.v.), 23 m. NE. of Avellino (q.v.). It was originally a Samnite tn (see SAMNITUM). There is a cathedral. Pop. 10,000.

Arians, see **ARIUS**.

Ariarathes, name of sev. kings of Cappadocia: (1) Son of Ariamnes I, defeated and slain by Perdiccas 322 bc. (2) Son of Heliophanes, and nephew of A. I, became king 315 bc. (3) Son of Ariamnes II, and grandson of No. 2, died 220 bc. (4) Son of No. 3, reigned 220-162 bc; assisted Antiochus the Great against the Romans, and obtained peace in 188. (5) Son of No. 4, surnamed Philopator, reigned 163-130 bc. He was expelled by Demetrius Soter, but was restored by the Romans, whom he helped against Aristonicus of Pergamum. (6) Son of No. 5, reigned 130-96 bc, and was put to death by Mithridates. (7) Son of No. 6, also murdered by Mithridates, who then reigned. (8) Second son of No. 6, was deposed by Mithridates. (9) Son of Ariobarzanes II, reigned 42-36 bc, and was deposed and put to death by Antony, who appointed Archelaus in his stead.

Arias, Montanús (1527-98), Sp. orientalist, b. at Fregenal de la Sierra, in Estremadura; studied at the univs. of Seville and Alcalá, and took orders in 1559. In 1562 he was consulting theologian to the Council of Trent, and in 1571 pub. a commentary on the minor prophets. From 1568 until 1573 he was engaged in editing the Polyglot Bible at Antwerp. In 1575-6 he was acquitted at Rome on a charge of heresy.

Aribert, or **Heribert** (d. 1045), Archbishop of Milan, 1018-45. He was one of the leaders of the Ghibelline party, and in 1026 crowned the Emperor Conrad II, whom he had invited to Italy, as King of Milan.

Arica, seaport tn, cap. of Arica dept, Tarapacá prov., N. Chile, about 40 m. S. of Tacna by rail. A completely rainless district, and seaside resort. It is the prin. port for Bolivia, and exports copper, guano, silver, salt, etc. The tn was the subject of the long dispute between Chile and Peru, which led to mediation by the U.S.A. The settlement, accepted by both countries in May 1929, awarded A. to Chile in return for payment to Peru of a sum of \$1,200,000, and Tacna to Peru. The prosperity of the tn has been diminished by frequent earthquakes, of which the chief occurred in 1868. Pop. 14,000.

Arichat, seaport of Richmond co., Nova Scotia, on Isle Madame. It is the seat

of a Rom. Catholic bishop and possesses a good harbour, from which there is some fishing. Pop. 500.

Aricia, anct. tn of Latium, on the Apian Way, 16 m. SE. of Rome. In 388 BC it was subdued by the Romans, and received the Rom. franchise. In its neighbourhood, beside the Lacus Nemoensis, was a celebrated grove and temple of Diana Aricina, where, until about the 1st cent. AD, there survived a unique relic of barbarian worship. The priest, called *rex nemorensis*, held office until he was slain by a stronger rival. (See Sir J. G. Frazer, *The Golden Bough*, Ch. I.) The Chigi Palace at A. was much damaged by bombs in the Second World War.

Aricina, see ARICIA.

Aricine, see CINCHOVATINE.

Aridaeus, see ARRHIDAEUS.

Ariège, dept. of S. France, formed of parts of the anct. provs. of Languedoc and Gascony, and the co. of Foix. Spurs of the Pyrenees cover a large part of the dept, and there are many fertile valleys. It is watered in the E. by the A., and in the W. by the Salat, both rvs. being tribs. of the Garonne. Grain, vines, vegetables, potatoes, and hemp are produced, and live-stock is raised. Iron, zinc, manganese, and bauxite are mined, and there are chemical, metallurgical, textile, and paper industries. The prin. tns are Foix (the cap.), Pamiers, and St.-Girons (qq.v.). Area 1890 sq. m.; pop. 140,000.

Ariel: 1. Word signifying lion of God or altar of God, is in Isa. xxix. 1 applied to Jerusalem. In later Jewish times the name is given to a water spirit. One of the fallen spirits in *Paradise Lost* bears this name. See also Pope's *Rape of the Lock* and Shakespeare's *Tempest*. In astronomy, one of the satellites (the inmost) of Uranus.

2. Title of internationally influential work by the leading Uruguayan thinker and politician José Enrique Rodó, 1900.

Aries, or the Ram, first sign of the zodiac (q.v.), which the sun enters about 2 Mar. The Gk mythology makes A. the commemoration of the Golden Fleece, in quest of which the Argonautic expedition was undertaken.

Arietta (diminutive of the It. word *aria*), in music, a short air.

Arikara, Caddoan tribe of N. Amer. Indians formerly belonging to the Pawnees. They originally lived on the Missouri, in N. Dakota, existing by hunting, agriculture, and barter with white settlers. They now number a few hundred, and share Fort Berthold Reservation in N. Dakota with the Mandans and Hidatsas. See J. O. Dorsey, *Traditions of the Arikara*, 1904.

Arillus, or Aril, in some plants forms an exterior appendage to the seed. It develops after fertilisation, proceeding from the placenta, and partially invests the seed, after which it falls spontaneously. The mace of the nutmeg and the scarlet covering of the seeds of the climbing bitter-sweet and yew are true A.s.

Arimaspi, mythical Scythians of the E. coast of the Caspian, who were one-eyed,

and waged perpetual war with the griffins for gold washed down by the R. Arimaspius.

Arriobarzanes: 1. The name of kings of Cappadocia: (1) Surnamed Philoromaeus, reigned 93–63 BC, having been chosen by the Romans. During his reign he was sev. times expelled, but was finally restored by Pompey shortly before his death. (2) Surnamed Philopator, succeeded his father, 63 BC, but was assassinated in 51. (3) Surnamed Eusebes and Philoromaeus, succeeded his father in 51 BC, and reigned until 42, when he was slain by Cassius.

2. The name of kings or satraps of Pontus: (1) Who reigned c. 400 BC. (2) Son of Mithridates I, reigned 363–337 BC. He revolted against Artaxerxes in 362. (3) Son of Mithridates III, reigned 266–250 BC.

Arion (c. 625 BC), Gk lyric poet, b. Lesbos, but made his permanent residence at the court of Periander of Corinth. He is said to have given the dithyramb its artistic form. Herodotus tells us that returning to Corinth by sea with much treasure, after a visit to S. Italy and Sicily, the sailors plotted his death. He pleaded permission to play his lute, and then, throwing himself into the sea, escaped on the back of a dolphin whom the melody had attracted. No fragment of his work survives. See A. W. Pickard-Cambridge, *Dithyramb, Tragedy, and Comedy*, 1927.

Arioso, vocal or instrumental piece of a recitative character, but of a more melodious kind. Also means the kind of melodic singing suitable for the greater arias.

Ariosti, Attilio (1666–?). It. composer, b. Bologna. He produced operas at Venice and Berlin, and finally in London. He wrote, so far as is known, 22 operas, 5 oratorios, cantatas, and lessons for *viola da gamba*.

Ariosto, Ludovico (1474–1533), described by Hallam as having been, 'after Homer, the favourite poet of Europe,' b. Reggio. For some years he studied law in compliance with his father's will, but his bent from the first was towards literature. His father d. early, and he was forced to enter the household of the Cardinal Ippolito d'Este. His life was busy, for he was perpetually engaged in embassies to Rome and in diplomatic business. Yet he managed in the intervals of business to complete his great work, the *Orlando Furioso*, of which the first ed. in 40 cantos was pub. at Ferrara in 1516. In 1517 he quarrelled with the cardinal, and entered the service of the Duke of Ferrara, Ippolito's brother. His situation was not greatly improved, and in 1521 he was appointed governor of the Garfagnana, where his energies were chiefly devoted to the suppression of bandits and the enforcement of order. He retired some years later, and devoted himself to the final revision of *Orlando*, which appeared in 46 cantos. The delight of the poem is in its harmonious, accurate intricacy, its interrupted climaxes, and surprising confluence of scattered incidents.

The praises of Cardinal Ippolito and the Duke of Ferrara are sung in the comically fulsome asides of the poem, while the cardinal's real meanness and mediocrity are immortalised in the *Epistles*. Next year he d. at Ferrara, where he was buried in the church of San Benedetto. Besides his great work he wrote 5 plays, 7 satires after Horace, some Lat. poems, and a prose dialogue *Erbolale*, on the subject of hygiene, *Rime* (sonnets, etc., and elegies), and a fragment, *Cinque Canti*. His distastes and weaknesses make him the eternal contemporary of Horace and Lamb, for whom, similarly, the stirring events of the times in which they lived were not much more than additional perturbations in the never sufficiently calm tenor of their private life.

The subject of the *Orlando* had already been treated by Pulci in his *Morganle Maggiore*, and by Boiardo in his *Orlando Innamorato*, and of this latter work the *Orlando Furioso* is professedly a continuation. It is the triumph of the half-satiric, fantastic, yet lovely style which Boiardo had hardly attained. What raises A. to the level of the greatest poets is the sustained zest of his execution upon the huge scale he chose for representing his own private world. In A. Croce sees the model It. artist, just as in Cavour he sees the model It. politician. The first complete ed. of *Orlando Furioso* was that pub. in Ferrara in 1532. The ed. of Morali, 1818, follows the text of the 1532 ed. with great correctness. A good modern ed. is that by Papini, pub. in Florence, 1903. The indifferent trans. into English of Sir John Harrington, 1591, and Hoole, 1783, were superseded in 1823 by the spirited rendering of Stewart Rose. See also J. S. Nicholson, *Life and Genius of Ariosto*, 1914; Benedetto Croce, *Ariosto, Shakespeare, and Corneille* (Eng. trans. 1920); W. Binni, *Melodo e poesia di Ludovico Ariosto*, 1947.

Ariovistus, Ger. chieftain who crossed the Rhine in 71 bc at the invitation of the Arverni and Sequani during their struggle with the Aedui for supremacy in Gaul. A., however, tempted by the rich farmlands of Alsace, occupied the country, brought over thousands of his Ger. subjects, and oppressed his former allies. In the summer of 58 bc, after the defeat of the Helvetii, a Gallic council appealed to Julius Caesar, who annihilated the Ger. forces, probably near the R. Fecht. (See *De Bello Gallico*, I.)

Aristaenetus (5th or 6th cent. AD). Gk epistolographer who should be distinguished from A. of Nicaea who perished in the earthquake at Nicomedia in 358. To him are attributed 50 erotic epistles wholly lacking in originality. The text was printed in Hercher's *Epistolographi Graeci*, 1873.

Aristaeus, god worshipped in anct Thessaly, Boeotia, Arcadia, and Thrace. Son of Apollo and the nymph Cyrene, he was educ. by Chiron the centaur. At Thebes he married Autonoe, daughter of Cadmus, and begat Actaeon. A. was the protector of herdsmen and teacher of bee-keeping and olive-tree cultivation.

Aristagoras (d. 497 BC), brother-in-law of Histiaeus, tyrant of Miletus, for whom he acted as regent during the latter's absence at the Persian court. Having fallen in an attack upon Naxos, and thereby fallen into disfavour with the Persians, A. raised the whole of Ionia in revolt (499). He obtained assistance from Athens and burned Sardis; but his troops were driven back to the coast. A. withdrew to Thrace, where he was afterwards killed in an attack on the Edonian city of Ennea Hodoi (later Amphipolis). See G. B. Grundy, *The Great Persian War*, 1901.

Aristarchus, name given to a crater in the NE. quadrant of the moon. It is the brightest object on the moon and is visible as a luminous spot when all the surrounding region is involved in shadow.

Aristarchus of Samos (c. 310–251 BC), Gk astronomer, all of whose works are lost except a short treatise *On the Magnitudes and Distances of the Sun and Moon*. He was the first to assert that the earth revolved about the sun and also rotated on its axis.

Aristarchus of Samothrae (c. 220–143 BC), Gk grammarian and critic. Having settled at Alexandria, he studied under Aristophanes of Byzantium (q.v.), and later succeeded him as keeper of the Alexandrian library. On the accession of Ptolemy Euergetes (145) A. fled to Cyprus where he is said to have d. by voluntary starvation. His enormous output is believed to have included 800 commentaries, chiefly upon the poets; but he is chiefly remembered for his critical ed. of Homer which first divided the *Iliad* and *Odyssey* into 24 books each and was the foundation of all later recensions. See J. E. Sandys, *History of Classical Scholarship*, vol. I, 1921.

Aristaeus, reputed to have been sent by Ptolemy Philadelphus, King of Egypt, to the high priest Eleazar to obtain people to translate the O.T. into Greek. A. is said to have gathered together 72 Jewish translators, who assembled on an is. to carry out the task, which, when finished, was called the Septuagint, i.e. the version of the Seventy. This story is related in the *Epistle of A.*, which is considered spurious and of which the date is uncertain. But see SEPTUAGINT.

Aristias (c. 1798–1884), Gk poet who lived in Wallachia. He is celebrated for his trans. of the *Iliad* into Rumanian verse, and he took an active part in the political movements for the independence of Greece.

Aristides (c. 530–468 BC), surnamed the Just, an Athenian statesman. He was the son of Lysimachus, and came of a well-to-do family. He was one of the 10 *strategoi* at Marathon (490 BC), and persuaded his fellow generals to alter the arrangement that each should lead for 1 day, and to give Miltiades full power. In the next year he was made chief archon, and his zeal for the conservative policy brought him into conflict with Themistocles, the democrat, by whose influence A. was ostracised c. 484 BC. In 480 Xerxes invaded Greece, and Themistocles,

eager to stop dissension, secured the passing of a decree recalling all post-Marathonian exiles. A. profited by this, and did good service at Salamis. In 479 he was re-elected *strategos*, and shared with the Spartan Pausanias the glory of the victory at Plataea. He later took the lead in the formation of the Delian league. A. d. poor, and his family were compelled to accept pensions from the State.

Aristides, Aelius (c. AD 120-89), sur-named Theodorus, Gk sophist and rhetorician. He was the son of Eudaemon, and studied under Polemon of Smyrna and Herodes Atticus. After many travels he settled at Smyrna. Prior to this he had been troubled by illness for 13 years, but this did not hinder him from the pursuit of his studies. In 178, when Smyrna had been destroyed by an earthquake, he secured from the Emperor Marcus Aurelius its rebuilding at the imperial expense. Fifty-five of his speeches are extant, as also certain other works. Prin. ed. W. Dindorf (3 vols.), 1929. See A. Boulanger, *Aelius Aristide*, 1923.

Aristides, Quintilianus (3rd cent. AD), Gk author of an important treatise on music, which was first printed by Meibomius in 1652.

Aristides of Thebes, Gk painter and contemporary of Apelles. According to Pliny, he was the first to try to give expression to his characters. His best-known picture was one of a child approaching his mother, who lay wounded and dying in the midst of a sacked city.

Aristion, see **ATHENION**.

Aristippus (fl. 4th cent. BC), Gk philosopher, founder of the Cyrenaic or Hedonist school (see **CYRENAICS**), b. Cyrene. He was a pupil of Socrates, whose philosophy, however, he debased, making pleasure the final aim of life. He lived, therefore, the life of a philosophic voluptuary, while at the same time retaining restraint over his passions. He passed much of his life at Syracuse at the court of Dionysius, and lived some time at Corinth in intimacy with the famous courtesan, Lais. His doctrines were taught after his death by his daughter Arete, and later by her son, A. the younger.

Aristobulus of Cassandria (4th cent. BC), Gk historian who accompanied Alexander the Great on his campaigns, and later wrote an account of them. Arrian made considerable use of his works.

Aristocracy, theoretically a form of gov. administered by the best citizens (Gk *aristos*, best). In practice gov. by the nobility. See **GOVERNMENT** and **OLIGARCHY**.

Aristodemus (8th cent. BC), King of Messenia, who waged a 20 years' war for independence against the Spartans. He committed suicide in despair of final success, on the receipt of unfavourable oracles.

Aristogiton (6th cent. BC), noble Athenian who, together with Harmodius, plotted the death of the tyrant Hippias and his brother Hipparchus. Hipparchus was murdered at the Panathenaic festival, 514 BC. Harmodius was immediately killed. A. escaped but was afterwards taken and

put to death by Hippias. Four years afterwards Hippias was expelled, and Harmodius and A. were regarded as martyrs, bronze statues being erected to them in Athens. According to Thucydides and Herodotus (vi. 123), the plot arose out of a private quarrel, and was not undertaken in the cause of liberty.

Aristolochia, family *Aristolochiaceae*, genus mostly of shrubs, often climbing, of temperate and warm regions; with pungent aromatic roots, and tubular flowers. *A. clematitis*, Birthwort, is cultivated as a medicinal plant, and is naturalised in Britain. *A. macrophylla* (synonym *sipho*), Dutchman's Pipe, is a popular N. Amer. garden climber.

Aristomenes (7th cent. BC), Messenian general who led his countrymen in the second Messenian war. After a number of daring attempts and brilliant successes he was betrayed by Aristocrates of Arcadia (668), and fled to Rhodes, where he d.

Aristophanes (c. 444-c. 380 BC), the most renowned of the Gk comic dramatists, probably b. at Athens, where he spent his life. His education was of the best, and he favoured throughout the aristocratic and conservative party. His production began early, and altogether 54 comedies are ascribed to him, of which 11 only are extant. These comedies fall into 3 well-defined periods, the first extending from 427 to 421 BC, the second to 405, the last to 388. His early plays show unrestrained political satire, the second period shows more restraint, and in the plays of the third period the satire is chiefly social. His extant plays of the first period are 5. *The Acharnians* (425) seeks to aid the peace party by drawing the contrast between Lamachus the warlike and Dicaeopolis, an honest countryman, who makes peace with Sparta on his own account, and on whom all blessings are showered. *The Knights* (424) is a vigorous attack on Cleon, who for a while beguiles the populace represented under the name of Demos. Demos is finally rescued and his youth restored. *The Clouds* (423) satirises the Sophists and especially Socrates, the proprietor of a 'thinking shop' where all dishonesty is taught. Alcibiades is represented under the name of Pheidippides, the young Athenian. In *The Wasps* (422) A. ridicules the Athenian love of law-suits, and in *The Peace* (421) he continues the theme of the Acharnians, advocating once again a truce with Sparta. To the second period belong 4 plays. In *The Birds* (414) 2 old Athenians leave the town and persuade the birds to build in mid air the city of Cloud-Cuckoo-town. The gods are thus cut off from the sacrifice of men, and the sceptre is regained from Zeus. Some have seen in this play an allusion to the Sicilian expedition. *Lysistrata* (411) shows the women taking the affair into their own hands and making peace. *The Thesmophoriazuses* (411) contains an attack on the tragic poet Euripides. *The Frogs* (405) continues this literary satire. Dionysus is sent to Hades to fetch a poet, Aeschylus and Euripides having just died.

These two contend for the throne of tragedy, which is finally won by Aeschylus. In *The Ecclesiazusae* (392 or 389 bc) the dramatist ridicules the mania for communism, while *Plutus* (388) is merely a moral allegory. The works of A. are characterised by wit and hearty humour, by a perfect agreement of matter and form, and by exquisite lyric quality.



British
Museum

ARISTOPHANES

The best text is that ed. by V. Coulon and H. van Daele (with Fr. trans., 5 vols., 1923-30). There is an Eng. ed. with commentary and trans. by Benjamin Bickley Rogers (11 vols., 1875-1947). Frere's trans. is pub. in Everyman's Library. See G. Murray, *Aristophanes*, 1933, and V. Ehrenberg, *The People of Aristophanes* (2nd ed.), 1951.

Aristophanes of Byzantium (c. 257-c. 183 bc), Gk scholar. He studied at Alexandria under Zenodotus and Callimachus, and was appointed head of the Museum Library c. 187 bc. His works included eds. of Homer and other poets; his arguments to the plays of Aristophanes and the tragedians are in large part preserved. A. also did valuable work as a lexicographer and grammarian, and introduced critical signs. See A. Nauck, *Aristophanes Byzantii Grammatici Fragmenta*, 1848, and J. E. Sandys, *History of Classical Scholarship*, vol. i, Ch. VIII (3rd ed.), 1921.

Aristotelia, 'those things pertaining to Aristotle.' See ARISTOTELÆ.

Aristotle (384-322 bc), Gk philosopher and scientist, b. Stagira (modern Stavro) in Chalcidice, whence he is often called 'the Stagirite.' His father, Nicomachus, was a member of the Asclepiad guild and physician to Amyntas II of Macedonia.

His mother's name was Phaestis. In his eighteenth year A. entered the school of Plato (the Academy) at Athens, and immediately came under that influence which is manifest in all his writings, even when he disagrees with his master. So outstanding was his ability that Plato spoke of him as 'the reader' and 'the mind of the school.' A. remained at the Academy for 20 years, partly as a pupil, but partly also engaged in independent studies and (probably) in the composition of some of his lost works. Further, in this period some of his extant writings seem to have been begun. When Plato d. in 347 he was succeeded as head of the Academy by his nephew Speusippus, who represented a trend of Platonism which A. could not accept. A. therefore, together with his fellow student Xenocrates, emigrated to the court of Hermias, ruler of Atarneus and Assos in Mysia, where he became the leading figure of a philosophic circle, and married Pythias, niece of Hermias, who bore him a daughter. At the end of 3 years he moved to Mitylene in Lesbos, but in 343-342 accepted an invitation from Philip II of Macedon to undertake the education of Alexander who was then 13 years old. In 335-334, soon after his pupil's accession to the throne, A. returned to Athens, where he rented some buildings and founded his school (the Lyceum) in a grove sacred to Apollo Lyceus and the Muses, between Mt Lycabettus and the Ilissus. Here each morning he walked up and down (hence the name Peripatetic), discussing logic, physics, and metaphysics; and in the afternoon or evening lectured indoors to a larger audience upon less abstract subjects. On the death of Alexander, in 323, the hostility of the anti-Macedonian party resulted in a charge of impiety against A., on the absurd grounds that he had deified Hermias in a hymn and an epitaph. A. thereupon withdrew to Chalcis in Euboea, a stronghold of Macedonian influence, where he d. His will has been preserved by Diogenes Laertius: it affords evidence of a grateful and affectionate nature. Soon after A.'s return to Athens his wife d., and he entered into a permanent union with Herpyllis, a native of Stagira, who bore him a son, Nicomachus.

His writings have unfortunately come down to us in a very confused form. It is certain that many of those attributed to him are not genuine, and the condition of the authentic works is far from satisfactory. The language of most of them is abrupt, and conversational promises are made and then forgotten; there are sudden breaks in the thread of the argument; sometimes they are redundant, sometimes inconsistent. In a word, it is evident that these writings, which have so profoundly affected the thought of all succeeding ages, were neither completed nor arranged by the writer himself. It has, indeed, been suggested that they are nothing more than the notes taken down by his scholars from dictation, and afterwards ed. by them. This hypothesis is refuted both by the extreme compression of parts of the works and by the fact that it is now

generally agreed that the works as we have them are, in the main, the unfinished notes and discourses of A. himself. Much of their disconnectedness may be attributed to the length of time over which their composition was probably spread, and to the development of his theories during this time. Strabo, the geographer, relates that on the death of A. his library, after passing through many hands, came into the possession of Andronicus of Rhodes, and became the basis of his ed. of the works prepared c. 70 BC.

The surviving authentic works are as follows: (1) *Organon*, comprising *Categoriae* (less certain parts), on the 10 classes of predicates; *De Interpretatione*, on language, dealing with the proposition and its parts; *Analytica Priora*, in 2 books, dealing with the syllogism; *Analytica Posteriora*, in 2 books, dealing with the method of scientific demonstration; *Topica*, on dialectical syllogism and reasoning from probabilities; *Sophistici Elenchi*, on the fallacies of which the sophists made use, their refutation and their solution. (2) Physical treatises: *Physics*, *De Caelo*, *De Generatione et Corruptione*, *Meteorologica*. (3) Psychology: *De Anima*, *Parva Naturalia* (*De Sensu et Sensibili*, *De Memoria et Reminiscencia*, *De Somno*, *De Somniis*, *De Divinatione per Somnum*, *De Longitudine et Brevitate Vitae*, *De Vita et Morte*, *De Respiratione*). (4) Biology: *Historia Animalium* (less certain parts), *De Partibus Animalium*, *De Motu Animalium*, *De Incessu Animalium*, *De Generatione Animalium*. (5) *Metaphysics*. (6) *Ethics*: *Ethica Eudemia*, *Ethica Nicomachea*. (7) *Politics*: *Politica*, *Athenaion Politeia*. (8) *Rhetoric*. (9) *Poetics* (a fragment).

Aristotle's Philosophy. Though A. never allows us to forget the great degree in which he differed from his master Plato, yet it is important to remember that he can always in his earlier period speak of the Platonic tenets as those which *we* hold. In fact, A. was probably much more in sympathy with Plato than were his immediate successors at the Academy. Yet their difference as to the attitude of inquiry was fundamental, and may thus be briefly put: Plato takes his departure from the eternal, from the universal form; A. from the actual world of nature, from the individual substance. Plato was a poet and an idealist; A., though possessing a great range of interest, is fundamentally a man of science. Their points of agreement and difference are well shown in the *Metaphysics*, where we see that whereas Plato finds reality only in the universal 'idea,' A. seeks it in the individual things, which he defines as a combination of the universal form and matter. Yet both agree that the reality or essence of the thing lies in the idea. But a more important divergence is in A.'s criticism of the Platonic 'ideas' as being only potential and not actual causes of the phenomena of the world. Hence is elaborated the famous doctrine of the 4 causes which combine to produce any individual object, and which give 4 lines of inquiry when investigating it. These are: (1) the material

cause, or the material conditions of its existence; (2) the essential or formal cause, giving its essential character and realisation; (3) the efficient cause, through the agency of which it comes into being; (4) the final cause, giving the end or result attained by it. But the work deals also with theology, and A. expressly speaks of the prime and unmoved movement of the earthly and heavenly bodies as God. His language on the subject is simple, and perfectly clear. God is the supreme excellence, more excellent than anything that we can attain to. He is perfect, with eternal and continuous life. The philosopher then explains the anthropomorphic mythology of the time as accretions which have been added for the use of the vulgar to the original conception of a single divinity investing the whole of nature. There are many omissions in the scheme of metaphysics, and difficulties are multiplied by the fact that A. had to invent many of his technical terms and that he did not always use them in the same sense. The invention of logic was, perhaps, the prin. work of A. He regarded it as no true part of philosophy, but as its handmaid or instrument, and hence the name *Organon* given to the group of treatises on the subject. Even this name was given it by the later Peripatetics. The founder of logic himself gave it no name, neither subdividing the subject nor combining it into a system. It is noteworthy, too, that in his classification of the sciences he gave no place to this one of his own evolution.

A.'s scientific treatises have long since fulfilled their purpose. His researches show insight, observation, and knowledge; but their intrinsic value was never great, and in later ages they showed signs of becoming a positive hindrance to progress through the reverence felt for his great name.

The metaphysical and physical philosophy, together with the logical treatises, were grouped together by the author as speculative science; while practical philosophy comprised the *Ethics*, *Politics*, and treatises on Art. The *Politics* are the application to the state of the principles which had been applied to the individual in the *Ethics*. Briefly, they consist of the old question: 'What is man's greatest good, and how can it be realised?' There are various degrees of goodness, of which the chief are theoretical wisdom, which is the highest, practical goodness, and goodness of character. The first of these is the contemplation and comprehension of the loftiest principle of the universe. Practical goodness consists in the carrying out of the moral virtues. Goodness of character is the habit of mind which enables a man to choose the mean between extremes of extravagance. These last 2 forms of goodness should not be neglected by the philosopher, but should be developed at the same time as the highest. Since, however, reason is obviously the highest faculty of the soul, being, in fact, the one thing which differentiates man from the other organic bodies and approximates him to God, it should receive the

supreme place. In the *Politics* the subjects dealt with are the good of the individual citizen, which should consist in the happiness of virtuous action, and the good of the state. Right govts., then, are those which aim at the general good, and they may be either: (1) *Monarchies*, the rule of one man excelling in virtue; (2) *Aristocracies*, the rule of a class excelling in virtue; or (3) *Commonwealths*, the rule of the many who excel in virtue. On the other hand, the wrong govts. are perversions of these 3 forms. A wrong gov. may be: (1) a *Democracy*, aiming merely at the good of the majority; (2) an *Oligarchy*, aiming at the good of the few; or (3) a *Tyranny*, aiming at the good of one man. All these last are distinguished by the fact that their aim is the benefit of the ruling body rather than that of the whole community. Last to be considered are the 2 works in which the art of production is dealt with, the *Rhetoric* and the *Poetics*. The first is a treatise on the art of persuasion, and its influence has been almost nil. In the *Poetics* A. shows himself a literary critic of the first order. After a subdivision of the kinds of poetry, he deals at length with tragedy, which, he says, 'by raising pity and fear, purges the mind of these passions.' Perhaps no literary judgment has given rise to more controversy as to its meaning, controversy which is not yet ended. From the commentators on this work, and not from the work itself, is gathered the famous theory of the 3 unities which was so long attributed to A. himself. Misunderstanding though it was, it has influenced the whole course of European drama. Not until the Middle Ages did the period of A.'s greatness begin, and then he was known only in Arabian trans. From the trans. of Avicenna and Averroes his philosophy was taken up by the schoolmen, and made the framework in which to arrange the theology of the Christian Church. His writings were generally received as the summary of sciences, and as such they were taken up and reconciled with Catholic dogmas, which his philosophy was used to express, by the great St Thomas of Aquinas. With the Renaissance came a natural reaction, but even here the philosopher himself recovered rather than lost prestige. His works were studied in the original, and many of the errors of his commentators removed.

The standard ed. of the complete works (including those now recognised as spurious) is that of I. Bekker and others (5 vols.), 1831-70. See also *The Works of Aristotle Translated into English* (ed. J. A. Smith and W. D. Ross). There are also trans. of the *Metaphysics*, *Nicomachean Ethics*, *Politics*, and *Athenian Constitution*, and *Poetics* in Everyman's Library. See W. D. Ross, *Aristotle* (2nd ed.), 1930. and W. Jaeger, *Aristotle* (trans.), 1934.

Aristotle's Lantern, jaw apparatus in the sea-urchin, consisting of 5 hard pointed teeth in sockets formed by 5 ossicles. The teeth protrude through the mouth membrane and are actuated by muscles that enable them to be drawn

together or apart, inwards or outwards. The animal is thus enabled to scrape algae and seaweeds from the rocks to feed itself.

Aristoxenus, Gk philosopher, b. Tarentum c. 370 BC, a pupil of Aristotle. Three books of his *Harmonics* and part of his *Elements of Rhythm* are extant. There is an ed. with trans. and commentary by H. S. Macran, 1902.

Arita, tn of Sagakan, Japan, on the is. of Kiusiu. It is famous for the manuf. and export of porcelain. Pop. about 13,000.

Arithmetic, that branch of mathematics which treats of numbers. The study of A. is included in every scheme of education, mainly on account of its bearing on the practical side of everyday life. Measurement and the calculation of money values are dependent on some theory of number, and it is difficult to realise what we owe to the system of numeration by local value which we have adopted from the Hindus. The Greeks and Romans used clumsy symbols, and some idea may be formed of the difficulty of calculating in such symbols by attempting, say, to multiply CLIX by MDIV without using the decimal notation. The Hindu, or, as it is commonly called, the Arabic, system was introduced into Europe in the 11th cent., the double rule of 3 or compound proportion was introduced in the 16th, and in the next cent. Napier of Merchiston invented his system of logarithms, since when there has been little advance in the rules of A. proper.

A. as usually taught in schools consists of the consideration of the 4 elementary operations: addition, subtraction, multiplication, and div.; the application of those rules to measures of length, weight, money, etc.; the splitting up of numbers into factors, leading to the determination of least common multiple and greatest common measure; the system of fractions, vulgar and decimal, and its application to the determination of values by what is called practice; and the rule of 3, or proportion. An attempt is usually made to introduce ideas relating to commercial life by calculations on imaginary transactions involving percentages, interest, simple and compound, stock investments, bill discounting, etc., but sometimes this is relegated to what is called commercial A.

The value of A. as a school subject is threefold: it serves to equip the pupil for carrying on business involving quantities and values, it has a disciplinary or purely educational effect on the mind, as its processes illustrate the methods of reasoning, and it serves as an introductory step to the study of mathematics generally, which in its turn has its educational and purely utilitarian values. The disciplinary value depends mainly upon the methods of teaching, but the practical utility of A. depends upon the ease, accuracy, and rapidity with which the simpler relations of addition and multiplication can be recollected. It is customary and necessary for the addition of all pairs of numbers up to 10, and the multiplication of all pairs of numbers up to 10 or 12, to be learned 'by heart': that is, there should be no necessity to call up any

mental image of the quantities involved in the addition or multiplication; 7 times 9, for instance, should suggest 63 with certainty at once.

Text-books are numerous, and the number increases yearly, but the following may be referred to as being of general interest: F. A. Yeldham, *The Story of Reckoning in the Middle Ages*, 1926; L. T. Hogben, *Mathematics for the Million*, 1936; C. V. Durrell, *General Arithmetic for Schools*, 1936; R. T. Hughes, *Arithmetic*, 1939 (more advanced).

Arithmetical Complement of a number is the difference between that number and the next highest power of 10, e.g. the A. C. of 6 is $10 - 6 = 4$; of 49 is $100 - 49 = 51$; and of 7642 is $10,000 - 7642 = 2358$.

Arithmetical Mean, see MEAN.

Arithmetical Progression is a series of numbers which increase or decrease by a common difference, such as 2, 4, 6, 8, 10, 12, or 25, 20, 15, 10, 5. If a denote the first term, l the last term, d the common difference, and n the number of terms, then $l = a + d(n - 1)$ and the sum of all the terms $= \frac{(a + l)n}{2} = \frac{n[2a + d(n - 1)]}{2}$, obtained by substituting $a + d(n - 1)$ for l . See also MEAN.

Arius (c. 256-336), originator of the Arian heresy, b. Libyn, became one of the chief figures of the first great controversy in the Church. He went to Alexandria, and was there ordained deacon. In the Meletian schism he sided with Meletius and suffered excommunication; but later repented and was received back into the Church by Achillas, Bishop of Alexandria, who then ordained him priest, and gave him charge of one of the city churches. So great was the repute of A. that on the death of Achillas he expected to receive the see, but Alexander was chosen. When quite an old man, about the year 321, A. first broached his heresy, which in a less developed form had long been current at Antioch, where he had received his education. He denied that the Son was consubstantial (q.v.) with the Father, though affirming that He was begotten before time, and that by Him the Father created all things. A.'s aim was to prevent the idea of there being 2 Gods; and to avoid this he described the Son as a created Being, though far surpassing all others. Alexander excommunicated him, but he refused to give way, and sought help throughout N. Africa. Alexander also sent a circular letter to the bishops informing them of the course of events. Many favoured A., and the chief of his supporters were Eusebius, Bishop of Nicomedia (q.v.), who had been his fellow student at Antioch. A. was a skilled propagandist, and in his *Thalia* he explained his doctrines in verse set to music which was soon sung throughout the land. The controversy soon reached Rome, and Constantine, failing to realise the importance of the dogma in debate, made efforts for a compromise. This failing, he called the first oecumenical council at Nicæa in 325. Athanasius (q.v.), deacon

of Alexandria, was the chief exponent of the orthodox view, which insisted that the Son was 'of the same substance' (*homoousios*) with the Father, and round this word the battle raged. A. was condemned, and, with 2 bishops who supported him, banished to Illyria, while the orthodox creed was promulgated. The continued support of Eusebius of Nicomedia secured the recall of A. in 330, and he secured the ear of the emperor. Constantine, finding it impossible to compel Athanasius, now Bishop of Alexandria, to reinstate the heretic, banished the prelate to Gaul in 335. At last, in 336, Alexander, Bishop of Constantinople, was persuaded to consent reluctantly to admit A. to communion, but before this was done the latter was taken suddenly ill, and within a few hours was dead. Arianism became practically extinct in the empire before the end of the 4th cent. For a couple of cents. longer it lingered among the Goths and other Teutonic tribes who had received Christianity from Arian missionaries, chief of whom was Ulfilas.

Arizona (Indian Sp., meaning 'few springs' or 'dry belt'), state of the Union, N. America, situated between Utah on the N., New Mexico on the E., and Nevada on the W. It is known as the 'Valentine State.' It ranks fifth among the U.S.A., with a gross area of 113,999 sq. m., 329 sq. m. of this being water. The state is divided diagonally into 2 parts by the Mexican Cordillera. The N. region consists of a plateau, broken by high mts, which in the San Francisco Range attain a height of over 12,700 ft. In the S. and SW. are wide, desert plains watered by the Salt and Gila R.s. The Colorado and its trib., the Little Colorado water the NW. region. The ann. precipitation ranges from 1 to 10 in. In the W. and from 10 to 25 in. in the E. Few crops are grown without irrigation in the lowlands, the climate being dry and clear, suitable for astronomical observations, and the soil unproductive. Sev. large reservoirs have been constructed, the most notable being the Roosevelt, Coolidge, and Horse Mesa dams. The Yuma project for tapping the lower Colorado has recently been completed. It is a reclaimed section (96,000 ac.) receiving water from the All-Amer. Canal. Projects have also been made for supplying water for electrical power to the state copper mines. The most important crop is cotton, but wheat, barley, corn, etc., and semi-tropical fruit are also cultivated. Cattle and sheep are reared on the pasture lands, and the forests (13,668,000 ac.) provide good timber. The state is rich in mineral deposits, the greatest output being in copper, gold, silver, lead, and zinc, while granite, limestone, asbestos, molybdenum, tungsten, manganese, helium, and quicksilver are also worked in the state. The chief industry is the smelting and refining of copper. Lumbering, meat packing, food processing, cotton ginning, flour milling, and tanning are also important. A state univ. was founded at Tucson in 1891. There is also at Tucson a state agric. school. Enormous subterranean

caves, rivalling the Mammoth Caves of Kentucky, were discovered in 1909. The country was discovered by Marcos de Niza, a Spaniard, in 1539, rumours of its wealth having reached Spain through the explorer, de Vaca. In the following year Vasquez de Coronado explored the country, but the earliest settlements were made by Sp. missionaries at Tucson and Tubac about 1772. A. remained under the influence of Spain till 1821, when it achieved its independence. In 1848 it was ceded to the U.S.A., and was organised as a ter. in 1863, becoming a state of the Union on 14 Feb. 1912. In Congress A. is represented by 2 members of the lower House and 2 senators. In 1950 the pop. was 749,587. There are still 55,000 Indians. Pop. of Phoenix (cap.), 106,818; Tucson, 45,454; Flagstaff, 7663.

Ark of Noah, see FLOOD.

Ark of the Covenant, sacred chest of shittim (acacia) wood borne by the Israelites in the journey in the desert. It contained the 2 tablets of the law (Deut. x. 2) and was a focus of the Divine presence. It figured at the taking of Jericho, where it was borne, as was the rule, by the Levites. It was kept at Shiloh until captured by the Philistines and set up in the temple of Ashdod. Finally it found its resting-place in the temple of Solomon, until the fall of Jerusalem in 587 when (according to 2 Macc. 2) Jeremiah hid it in a cave until God should gather his people again. In post-exilic and N.T. times it no longer existed (Heb. ix. 5).

'Ark Royal', Brit. aircraft carrier, commissioned in 1939. Standard displacement 22,000 tons; main armament, 16 4.5-in. guns; h.p. 102,000; maximum speed, 30.75 knots. She was the third of her name in the annals of the R.N., and, in her record, a worthy successor to the first, the ship of 800 tons burthen which bore the Lord Admiral's flag in the fleet which defeated the Sp. Armada in 1588. She was torpedoed by a Ger. submarine in the W. Mediterranean near Gibraltar at about 6.30 p.m. on 12 Nov. 1941, and sank some 12 hrs later with the loss of only 1 man. Throughout her 2 years of service in the Second World War no ship was so frequently 'sunk' by enemy propagandists as was the *A. R.*, yet in fact, beyond a few scratches by splinters of bombs which fell in the sea, she suffered no damage in action until hit by a torpedo and sunk. Earlier in the war the *A. R.* disconcerted the enemy by appearing at Cape Town in search of the *Graf Spee*. It was her aircraft which ensured the destruction of the *Bismarck* (q.v.) in May 1941. Many ships of the It. Navy bore scars from the blows of her bombers, as did numerous bombers and reconnaissance craft of the *Regia Aeronautica*. Altogether some 67 It. aircraft fell victim to those of *A. R.*

A further carrier was later named *A. R. Arkansas*, S. central state of the U.S.A., bounded on the N. by Missouri, E. by Tennessee and Mississippi, S. by Louisiana and Texas, and W. by Oklahoma. The surface of the state is very varied. It

may be divided about equally into the NW. highland div. and the SE. lowland div. Out of the broad alluvial bottoms of low elevation which border the Mississippi R. and its chief W. trib. rise the Coastal Plains, which extend NW. to the Boston Mts belonging to the Ozark Uplift. The Mississippi forms the E. border, while its trib., the Arkansas, bisects the state from W. to E. Other important rivs. include the St Francis and White R.s to the N., and the Saline, Ouachita, and Red R.s to the S. The climate is pleasant and healthy, except in the malarial swampy dist. of the E. The normal rainfall is from 45 to 55 in., but even this is not sufficient for the rice-fields, which have to be flooded through artificial means. The chief product is cotton. Irrigation has made rice-growing an important industry, and much fruit is grown, also oats, hay, rice, and soya-beans. It is the only state in which diamonds have been found. Over a million tons of coal are raised annually, and upwards of 25,000,000 barrels of petroleum. Bauxite deposits give the U.S.A. 90 per cent of its supply. Lumber and timber products hold the first place in industry. There are good railroads, except in the mountainous dists. of the N. and W., the chief being those which connect the cities of the N.-central states with the Gulf cities of the S. There are natural hot springs, world-famed as a cure for rheumatism and kindred ills, and the tn of Hot Springs has sprung up beside them. A. was visited by the Spaniard, de Soto, in 1541, but the first settlement was made by Frenchmen at A. Post in 1686. The Mississippi was explored further by Marquette and Joliet (1673) and La Salle (1682), and the ter., after passing through Fr. and Sp. hands, was purchased by the U.S.A. in 1803. A. was made a ter. in 1819 and admitted as a state into the Union in 1836. Area 52,725 sq. m. One-fourth of the pop. is Negro. Pop. 1,909,511. The chief cities are Little Rock, the cap., 102,200; Fort Smith, 47,942; Texarkana, 40,628; Pine Bluff, 37,000; Hot Springs, 29,300; El Dorado, 23,706.

Arkansas River, after the Missouri the largest trib. of the Mississippi, rises in the mts of central Colorado, and flows SSE. and E. to Pueblo, Colorado (the Royal Gorge, 1050 ft deep, is here), E. to Hutchinson, Kansas, and SE. to the Mississippi 35 m. SE. of Pine Bluff, Arkansas. The flow varies greatly, and disastrous floods have occurred. Along much of the lower course there are levees. Length 1450 m.

Arkeeko, seaport on the W. coast of the Red Sea, 3 m. S. of Massawa.

Arklow, seaport tn and resort of co. Wicklow, Rep. of I., at the mouth of the R. Avoca, the Vale of which is famous for its scenery. There is a tradition that St Patrick landed there. A. was stormed by Cromwell in 1649, and in 1798 was the scene of sanguinary conflict between the Eng. soldiery and the United Irishmen, whose leader, Father Murphy, was killed there. Shelton Abbey mansion (2 m.), once the seat of the Earl of Wicklow, is

now a state forestry centre. Industries include shipbuilding, pottery, chocolate making, paint manuf., and fur dressing and dyeing. Pop. 5200.

Arkona, the NE. promontory of the Ger. Is. of Rügen (q.v.), in the Baltic Sea. On its summit is a lighthouse whose light is visible for 35 m., and on the W. are the ruins of the temple of the Wend deity, Svantevit.

Arkwright, Sir Richard (1732-92), inventor of cotton-spinning machinery, b. Preston, Lancs, the youngest of 13 children. His parents were poor, and he was early apprenticed to a barber. He estab. himself in this occupation at Bolton in 1750, where his profits were increased by his invention of a special method of dyeing

came to England in 1721. In London he painted the miniatures of the Pretender's sister and of the Duke of Marlborough. He bequeathed many books and curios to the library at Geneva.

Arlberg, mt mass in the Alps between the Austrian provs. of Tirol and Vorarlberg. These provs. are connected by the A. Pass, 5300 ft high; a railway tunnel (highest point 4300 ft) 6720 yds long has been in use since 1884.

Arlen, Michael (1895-1956), novelist, b. Rustchuk, Bulgaria, of Armenian parents. His original name was Dikrân Kouyoumdjian, but he changed it when he became a naturalised Brit. subject in 1922. Educ. at Malvern College, in 1920 he pub. *The London Venture*, and 2 years



THE AMPHITHEATRE, ARLES

human hair. He also gave himself to the study of the cotton machinery, but, as he had little mechanical skill, he secured the assistance of John Kay, a watchmaker of Warrington, in the carrying out of his designs. About 1767 he seems to have invented his celebrated *spinning-frame*, of which the chief value was its provision of the warp, which Hargreaves's spinning-jenny had been unable to supply. In 1769 he took out a patent for this, and erected his first mill at Nottingham. In 1771, with Jedediah Strutt and Samuel Need as partners, he built larger factories at Cromford, in Derbyshire. In 1775 he took out a fresh patent for further improvements, but these patents were continuously infringed on all sides, and in 1781 he took action in the courts. Public opinion, however, was inimical to him, and the verdict was unsatisfactory. The working classes hated him as a labour-saver, but his common sense enabled him to amass a fairly large fortune.

Arlaud, Jacques Antoine (1668-1743), miniature painter, b. and d. Geneva. He was held in great reputation in Paris, and

later his *Piracy* obtained favourable notice. Other books of his are *These Charming People*, 1923; *The Green Hat*, 1924, which brought him a fortune; *May Fair*, 1925; *Lily Christine*, 1928; *Young Men in Love*, 1929; *Babes in the World*, 1930; *Men Dislike Women*, 1931; *Hell! Said the Duchess*, 1934; *Flying Dutchman*, 1939.

Aries, Fr. tn, cap. of an arron., in the dept of Bouches-du-Rhône. It is on the A. canal, at the head of the Rhône (q.v.) delta. Originally a Gk., and later a Rom., settlement, A. became in the 4th cent. the chief city of Gallia (q.v.). At the beginning of the 10th cent. it became the cap. of the kingdom of A., which was formed from the anct kingdoms of Provence and Burgundy (qq.v.). In 1378 it passed to the Dauphin, afterwards Charles VI (q.v.). During the Second World War the in suffered some damage from air-raids. The picturesque, narrow, winding streets of A. are famous, and there are remarkable Rom. remains, including an amphitheatre, an aqueduct, and baths. The Romanesque-Provençal

church of St Trophime (formerly an archiepiscopal cathedral) has fine cloisters and a notable 12th-cent. portal. There are important museums, containing collections of pagan and Christian sarcophagi. In modern times the town has been celebrated for its connection with Van Gogh (q.v.). There are manufs. of sausages, machinery, and cement, and there is a trade in fruit and wine. Pop. 20,200.

Arlincourt, Charles Victor Prévôt (1789-1856), Fr. author, b. at the castle of Merantris, near Versailles. He held sev. gov. positions, but soon retired and gave his time to literature. Among his works are *La Caroleide*, a poem; *Le Siège de Paris*, a tragedy; and sev. novels in the style of Ann Radcliffe.

Arling, old name for the bird wheat-eat.
Arlington, Henry Bennet, Earl of (1618-1685), politician, b. Arlington, Middx. and educ. at Westminster School and Christ Church, Oxford. He fought for the Royalists and was wounded in the Civil war, and was employed afterwards by Charles as his agent at Madrid. Returning to England at the Restoration, he became a member of the 'Cabal'; he was created Lord A. in 1663, and Earl of A. in 1672. He was unsuccessfully impeached as a promoter of popery, a self-aggrandiser, and a betrayer of trust in 1674, and subsequently retired from politics.

Arlington: I. Town in Massachusetts, U.S.A. It manufs. textile machinery, wood products, and leather goods, and has an agric. trade (truck products, celery, dairy-ing). Pop. 14,453.

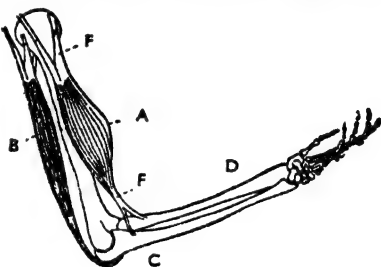
2. Co. in Virginia. On the heights across from Washington is situated the most famous of Amer. national cemeteries. The building and grounds were once part of the estates of the Lee and Custis families. The grounds were taken over by the Federal Gov. Here lie buried over 33,000 soldiers, among whom are many of the famous Federal officers of the Civil war. The body of the unknown soldier lies here in a splendid monument. In the co. are also U.S. Fort Myer, the National Airport, and the Pentagon Building.

Artiss, George (1868-1946), stage and film actor, b. in London. He made his first stage appearance at the old Elephant and Castle theatre, London, 1887, and his first tour in the U.S.A. with Mrs Pat Campbell, 1901. In New York he created the role of Zakkuri in *The Darling of the Gods*, 1902. After that year he devoted most of his acting time to theatres in America, where he became a universal favourite. In England he repeated his Amer. success in *The Green Goddess*, by William Archer. He also made a great reputation as a film star with impersonations of Disraeli, Wellington, Rothschild, and Voltaire. See *George Artiss, by Himself*, 1940.

Arion, cap. of the prov. of Luxembourg, S.E. Belgium. It is a thriving place, having considerable trade in corn, ironware, tobacco, clay pipes, and crockery. It is mentioned as early as AD 870. Pop. 12,300.

Arm, fore or upper limb in man from the shoulder to the wrist. The *humerus*, or bone of the upper arm, has at its upper extremity a convex spheroidal surface which fits into the glenoid fossa of the scapula, or shoulder-blade. The lower extremity has a small head or *capitellum* for articulation with the *radius*, and a *trochlea* or pulley for guiding the movements of the *ulna*. The *ulna* and *radius* are the bones of the forearm, and are articulated with each other and with the wrist-bones at the lower extremity.

The *deltoid* is the large muscle forming the shoulder cap, and serves to raise the A. from the side; it runs from the shoulder-blade to the middle of the humerus. The chief muscles engaged in lowering the A. again are the *latissimus dorsi*, which runs forwards and upwards from the back and



ARM, WITH FOREARM FLEXED

A, biceps; B, triceps; C, ulna; D, radius; F, tendons.

side of the chest wall to be attached to the front of the neck of the humerus; the *coraco-brachialis*, attached to the middle of the front of the humerus; and the *pectoralis major*, which forms the front fold of the armpit. The A. is flexed by the *biceps*, running from shoulder to elbow-joint in front, and is straightened by the *triceps*, running from shoulder to elbow at the back of the A. The muscles of the forearm consist of the flexors and extensors of the wrist and fingers.

The chief arteries are the *axillary*, passing through the armpit, and becoming the *brachial* as it traverses the upper arm, and the *radial* and *ulnar* arteries, which are the branches of the brachial running down the lower arm.

Fracture of the upper end of the humerus may result from direct or indirect violence. The neck or narrow part below the head is the most frequent seat of the fracture, which may result from a fall upon the shoulder, or indirectly from a fall on the outstretched hand or elbow. The bone is usually broken transversely with outward displacement of the upper fragment. Fracture of the shaft of the humerus is usually caused by a blow on the A. The broken ends as a rule overlap considerably owing to the pull of the muscle spasm. Fractures of the lower end of the humerus are commonly

caused by falls on the outstretched hand, and may involve the elbow joint. A rare but unpleasant complication of fractures in the region of the elbow is known as Volkmann's ischaemic contracture. In this condition the blood supply to the forearm is considerably reduced with the result that the muscles waste, becoming fibrosed and contracted, causing a flexion deformity. At one time it was thought that faulty splinting and compression of the brachial artery was the cause, but, although this may be a cause, it is now thought to be due to a spasmodic contraction of the blood vessels caused by the fracture itself.

Of the bones of the forearm, the radius is more liable to fracture, but both may be broken by a direct blow or by a fall.

Colles's fracture is a fracture of the end of the radius, from $\frac{1}{2}$ in. to $1\frac{1}{4}$ in. above the articular surface. It is usually caused by a fall on the open palm when the elbow is slightly flexed, and produces a characteristic backward displacement of the lower fragment and the hand. When fixing the A. in splints, the fingers should be left unconfined, so that after the first day the patient may move them freely; this is necessary in order that adhesion of the tendons to their sheaths may not occur.

Armada, Spanish. Armada is a Sp. word meaning simply an armed force, but is now applied especially to the great Sp. fleet fitted out against England in 1588.

As early as 1585 Philip II of Spain had decided to strike a decisive blow against England by invading the country with the help of a gigantic naval fleet under the command of the Duke of Medina Sidonia. It eventually consisted of about 130 ships, carrying 30,000 men, including about 19,000 soldiers. Probably only about 124 ships and 24,000 men actually entered the Channel, however. After sev. delays the A. left Lisbon in May 1588, it being planned that it should work in liaison with a military expedition from the Low Countries under the Duke of Parma, though quite how this liaison was to have been effected is not clear. Philip had been assured by Cardinal Allen that all Eng. Catholics would rally to the invaders.

The A. was scattered by a storm shortly after leaving Lisbon and had to put in at Corunna for repairs. It entered the Eng. Channel on 19 July. On 21 July Howard's fleet first estab. contact with it and a naval battle began which continued until 30 July, when the battered remnants of the A. broke off the fight and fled for the N. Sea. At first the battle was indecisive, Howard only being able to pick off isolated Sp. stragglers, while the main body of the A. sailed up the Channel towards Calais, practically intact. But Sp. morale was badly shaken by the Eng. tactics, and Sidonia, contrary to instructions, took refuge in Calais, and thus allowed the initiative to pass to the English. On the night of 28 July Howard, who had now been reinforced, sent 8 fireships into the midst of the Sp. galleons. In the ensuing confusion and

panic the Spanish cut their cables and made off in the direction of Dunkirk. At dawn on the 29th the Eng. ships engaged them at Gravelines. Furious fighting went on all day, practically every large vessel in the A. being severely damaged by the Eng. fire, and a shifting NW. wind soon threatened to blow the entire fleet on to the Dutch sand-banks. Sidonia decided to abandon the invasion attempt and to return to Spain by sailing round the Orkneys, Howard pursuing him as far as the Firth of Forth. Storms in the N. Sea and Atlantic caused further losses to the A. and it was Sept. before Sidonia and what was left of his fleet reached Spain.

Sp. losses cannot be accurately assessed. Probably about half the A. was totally destroyed, while the English lost not a single ship. Sp. morale suffered a devastating shock by the defeat, whilst morale in England and Protestant Europe rose correspondingly. Elizabeth I had a medal struck bearing the inscription: '*Deus flavit, et dissipati sunt*'. 'God blew, and they were scattered.'

The total tonnage of the 2 fleets was about equal; but the Eng. ships were faster and far more manoeuvrable, and in contrast to the Sp. concentration on soldiers, practically all those on board them were experienced seamen. The Eng. ships were armed with heavier guns, and their accurate fire could destroy the larger Sp. vessels from a distance beyond the range of the Sp. ordnance. Sp. strategy had all along visualised a naval battle in terms of land warfare, i.e. won primarily at close range by grappling and boarding, in the traditional manner. The Eng. long-distance salvos were a total departure from the accepted practice of cents., for which the Spanish were totally unprepared. See *State Papers relative to the Defeat of the Spanish Armada*, ed. by J. K. Laughton, 1894, and J. S. Corbett, *Drake and the Tudor Navy*, 1898-9. For the Sp. point of view, see J. A. Froude, *The Spanish Story of the Armada*, 1892, and F. Duro, *La Armada Invencible*, 1884-5.

Armadales, burgh of W. Lothian, Scotland, $2\frac{1}{2}$ m. W. of Bathgate, with iron and steel foundries and brick works. Pop. 5800.

Armadillo (Dasypodidae) is a family of edentate mammals peculiar to America, consisting of various species; it belongs to a family intermediate between the sloths and the ant-eaters. They are not, however, toothless, but have a variable number of simple molars, interlocking when the mouth is shut. They are covered with a hard bony shell, consisting of shields on the forehead, shoulders, and haunches, and of movable cross bands of plates across the back. They are of nocturnal habits, feeding on insects, worms, fruits, and roots; they are inoffensive, and their flesh is edible. By day they live in burrows in the forests or plains. Their range is from Texas to Patagonia.

Armageddon, in the Apocrypha, symbolic name for the last fight between the powers of good and evil. Its name is

indubitably taken from Megiddo, the famous battlefield (Judges v. 19) in the plain of Esdraelon.

Armagh: 1. Inland co. of N. Ireland, of 512 sq. m., bounded on the N. by Lough Neagh, on the E. by co. Down, on the S. by Louth, and on the W. by Monaghan and Tyrone. The NW. of the co. is undulating and fertile; the N. has extensive bogs, and on the S. is a range of barren hills. The chief rivs. are the Blackwater, which separates A. from Tyrone; the Upper Bann, which discharges itself into Lough Neagh; and the Callan, which flows into the Blackwater. The geological features of A. are: Lower Silurian rocks in the S. and centre; the trap of Antrim, with the underlying greensand, in the dist. round Portadown; carboniferous limestone in the basins of the Blackwater and Callan; granite in the S.E. mts.; and Tertiary strata in the neighbourhood of Lough Neagh. Lead veins have from time to time been worked in various parts of the co. The climate of A. is one of the most genial in Ireland, with the least rainfall of any co., and it has a large area of cultivable soil. The number of cattle, sheep, pigs, and poultry is increasing. The prin. crops are oats and potatoes, but grain crops are decreasing. Much flax is grown, and linen is still the prin. industry, though it has somewhat declined in modern times. Apples are grown in such quantities as to entitle the co. to its name, 'the orchard of Ireland.' The Great Northern Railway, whose main line from Belfast divides at Portadown, sends off lines to Omagh, Clones, and Dublin. A branch from Omagh joins the Dublin line to Goragwood, and from this line there is a branch to Newry in co. Down. An electric tramway connects Bessbrook, a tn with important linen manufs., to Newry. Pop. 109,000. The chief tns are Armagh, Lurgan, and Portadown. The co. returns 4 members to the Parliament of N. Ireland, and 1 to that of Great Britain and Ireland.

2. The co. tn of A., where the assizes are held. A. is the see of an archbishop of the Church of Ireland, who is the primate of all Ireland, and also of a Catholic archbishopric. The Gothic Protestant cathedral occupies the traditional site of the church built by St Patrick, and the Catholic cathedral was erected in 1840-73. Pop. 9300.

Armagnac, anct dist. in the S. of France, a part of Gascony, now generally included in the dept of Gers. It has a fertile soil, and is noted for its wine and brandy. The cap. was Auch (q.v.). See BRANDY.

Armagnac, Counts of, members of an anct ruling family of the Fr. prov. of A.; they ruled from 1319 to 1525. The most famous member of this family was Bernard VII, who gave the name of A. to the faction which was opposed to the Burgundians in the Civil war of 1410-35. In 1410 Bernard VII married his daughter to the young Duke Charles of Orleans, and henceforth was the head of the Orleans, or A., party. The Burgundians had on

their side the univ., the Paris mob, and the powerful guild of the butchers; whilst the A., or aristocratic, party were supported by Queen Isabella and the princes and aristocracy of Paris. The A. faction had for their banner that of the A. family, a white flag, whilst the Burgundians carried the cross of St Andrew. The struggle of the rival parties was ended in 1435 by the treaty of Arras, when the Burgundian court was reunited to that of France.

Armaments, Limitation of, see DISARMAMENT.

Armature, see ELECTRIC MACHINES.

Armavir, tn in Krasnodar kray of N. Caucasus, on R. Kuban'. Industries include food and agric. engineering. Railway junction. Pop. (1956) 102,000 (c. 1914, 44,000; 1926, 75,000; 1939, 84,000). Founded in 1848 as an Armenian colony, it was an important trade centre before 1930.

Armed Neutrality, league of the N. powers of Europe—Russia, Denmark, and Sweden—formed in 1780, which first gave international validity to the principle that 'free ships make free goods.' A proclamation of Catherine of Russia laid down (1) that neutral ships may sail freely from port to port and along the coasts of belligerents, so long as they do not carry contraband of war; (2) that only real and effectual blockade shall be recognised. The doctrine was accepted by Prussia and Austria in 1781, but refused by Great Britain. The league was suspended at the peace of 1783, but revived in 1800 for a short time. The settlement of the questions in international maritime law involved in the doctrines of the league was only made in 1856 by the declaration of Paris.

Armengaud, Jean Germaine Désiré (1797-1869), Fr. writer. He devoted his time to the study of art, visited the museums of Europe, and became a great critic. Among his works are *L'Histoire des peintres de toutes les écoles, depuis la Renaissance jusqu'à nos jours*, 1849, *Les Galeries publiques de l'Europe*, 1856-65, and *Les Chefs-d'œuvre de Rubens à la cathédrale d'Anvers*, 1859.

Armenia (Armenian *Hayastan*): 1. In the wider sense the ter. which in the past formed the core of the Armenian state and which until the end of the 19th cent. was to a considerable extent populated by Armenians. It comprises, besides the present Armenian Rep. (see below), adjacent parts of Soviet Azerbaijan (Karabakh, Nakhichevan'), the N.E. provs. of Turkey, and the W. parts of Persian Azerbaijan.

2. In the narrower sense the Armenian Soviet Rep., a constituent rep. of the U.S.S.R. It lies in the S. of central Transcaucasia and is largely a mountainous area with a dry, continental climate. It has large deposits of copper and of various mineral building materials. Area 11,500 sq. m.; pop. (1956) 1,600,000, mostly Armenians (83 per cent in 1939) and Azerbaijanis. There are copper, chemical, engineering, food, and textile industries; viticulture, horticulture, and

sericulture are practised; and cotton, wheat, and dairy cattle are raised. A cascade of hydro-electric stations is under construction on the R. Razdan which flows from the mountain lake Sevan (q.v.). The prin. tns are Yerevan (cap) and Leninakan. A. formed the N.E. part of the anc't Urartu (q.v.) state, later conquered by the Assyrians, Medes, Persians, and by Alexander the Great. A. regained independence in 189 BC. and under the dynasty of Artashesidae became a strong Hellenistic state, but after a series of military defeats had to accept a Rom., and later joint Rom.-Parthian, protectorate. A new dynasty of Arshakidae (AD 63-428) introduced Christianity as a state religion in 301. In 387 A. was divided between Persia and Byzantium; in 628 the whole of A. became a vassal of Byzantium, and in 652 of the Arabs, who soon transformed it into their prov. Under the third dynasty of Bagratidae (886-1045) A. regained independence and prosperity. Then followed new conquests by Byzantium, Seljuk Turks, Mongols, and Timur (1386-1402) and other Turkic conquerors. In the 17th-18th cents. A. was a scene of struggle between the Ottoman Empire and Persia. In 1828 N.E. A. was ceded by Persia to Russia and became a Russian prov. After the seizure of power in Russia by the Bolsheviks in 1917, Russian A. formed a part of the anti-Bolshevik Transcaucasian Federation (q.v.). Upon the latter's break-up an independent Armenian Rep. was set up, dominated by the Dashnaktsutyun (q.v.) party. Owing to the international situation (Turkish invasion, disputes and war with Georgia and Azerbaijan) its existence was precarious, and it was easily occupied by the Red Army in 1920 and transformed into a Soviet rep. which in 1922 was included in the Transcaucasian Federal Rep. and the U.S.S.R. Since the abolition of the Transcaucasian Federal Rep. in 1936 A. has been a constituent rep. of the U.S.S.R. Anti-communist guerrilla warfare continued in A. until 1923, and complaints of nationalist deviations in the rep. have been frequent. See J. de Morgan, *The History of the Armenian People* (New York), 1949; F. Kazemzadeh, *The Struggle for Transcaucasia* (New York), 1951; R. Pipes, *The Formation of the Soviet Union* (Cambridge, Mass.), 1954.

Armenian Atrocities. After the change in Russian policy and the failure of the great powers to secure reforms on their behalf from Turkey, following on the treaty of Berlin, the advanced party (Nihilist) amongst the Armenians determined to try to produce disturbances such as those that had resulted in the independence of Bulgaria, and so gain their object. The sultan then (1894) issued a *firman* calling upon all loyal subjects to aid in suppressing the revolt, and regular troops were called up from Erzerum. A massacre of a most brutal character followed, which aroused great indignation in Europe, and especially in Britain. In spite of international protests massacre followed massacre in quick

succession well into 1896, culminating in the butchering of about 7000 Gregorian Armenians in a 2-day massacre in Constantinople itself in Aug. 1896. The total number of those killed has been estimated at between 25,000 and 33,000, including those at Constantinople. Armenian revolutionary societies continued their propaganda down to the granting of the Turkish constitution in 1908; meanwhile further massacres occurred here and there, notably at Mush in 1904 and Van in 1908. Under the Young Turks 20,000 Armenians died in the Adana massacres in 1909.

In 1915 Christian Armenia was the scene of the most devastating massacres that had yet taken place. The Turks, in fact, were aiming at exterminating the entire Armenian race, in order to destroy any possible chance of Armenians acquiring autonomy then or at any future time; and such protesting voices as were raised were, in the nature of things, few and ineffective. Probably about 800,000 people died as a result. Further massacres took place at the time of the revival of Turkish aspirations in Europe and the Graeco-Turkish war, 1922, and mobs of refugees flocked into Iraq to seek the protection of the Brit. authorities there.

Armenian Church, founded by St. Gregory the Illuminator (q.v.), its first bishop. The A. C. isolated itself from all the rest of Christendom in the 6th cent. when it rejected the Council of Chalcedon, and excommunicated all who accepted it. It became monophysite, but its strongly national character led it to refuse communion even with the other monophysites. It embraces the whole of the Armenian nation, and has spread with this enterprising people all over the world. It is the largest of the Christian churches of the E. after the Orthodox. It is ruled by a Patriarch (the Catholics) with an Armenian Patriarch of Constantinople, and of Jerusalem, under him. Its bishops are chosen from the higher celibate clergy, entitled Vartapads. Its liturgy is more latinised than any other E. Christian rite.

Armenian Language and Literature. A., which Lord Byron considered 'a rich language which would amply repay anyone the trouble of learning it', belongs to the Indo-European (q.v.) family of languages. Old A. or *Grabar* is still the literary and eccles. medium, and is distinguished from the vernacular A., which has been employed since about the middle of the present millennium. It is termed *Ashksarhabar* or *Ashksarhik*, and contains a large proportion of Persian and Turkish elements. The language as a whole has many peculiarities of structure. There are 7 cases, and no distinction of gender amongst nouns; whilst there are in verbs 4 conjugations and 4 tenses. There are 2 main dialects, the Eastern (which is nearer to *Grabar* and is spoken principally in the mother country) and the Western (spoken in the 'diaspora'). The differences are chiefly grammatical and in the pronunciation of the consonants *b-p*, *g-k*, and *d-t*. The A. scripts are used

both for the *Grabar* and the vulgar forms of speech. A. as a whole has great strength and flexibility, but is consonantal and harsh to the ear. The alphabet originally contained 36 characters. Later 2 more signs were added. There are 2 types, capitals and minuscule. In the course of time the letters changed very slightly. No literary remains of the period before the introduction of Christianity exist save a few old songs and ballads. These suffice to show that in ancient times the Armenians were influenced by the Assyrian and Medo-Persian civilisations. The 5th cent. AD was the Golden Age of A. literature. A famous school of translators, the *surb thargmanitchek* (or 'holy translators'), was founded by St Sahak (see below). Sometimes the Gk alphabet was used by the W. and Syriac by the E. Armenians. Arzan (d. 459) trans. the works of St Athanasius into A., and wrote treatises against idolatry. In the beginning of the 5th cent. St Mesrob, with Sahak the Great, wrote the A. trans. of the Bible, which was esteemed the highest model of classic style. However, the earliest extant dated MSS. belong to the 9th (3 MSS.) and the 10th cents. (6 MSS.). The majority of the A. codices, including beautifully illuminated copies of the Bible, belong to the 12th and later cents. In the 14th cent. literature began to decline, and few works worthy of note were produced after this period; but since their dispersion the Armenians have always cherished their national literature. The A. script and versions of the Bible were the chief means of crystallising A. speech, which was the main factor in upholding the existence of the A. Church and nation. Armenian literature was purely monkish: there was not, as in the neighbouring country of Georgia, any epic or romantic literature. See E. Lidén, *Armenische Studien*, 1906; J. Marquart, 'Über das armenische Alphabet, etc.', *Handes Anzorya*, 1911; Y. Lalajian, *Catalogue of Armenian Manuscripts of Vassbourajan*, 1915; W. L. Williams, *Armenia, Past and Present*, 1916; J. J. M. de Morgan, *Histoire du peuple arménien*, 1919; E. Mader, *L'Evangile arménien*, 1920; H. Pettersson, *Arische und armenische Studien*, 1920; H. B. Dale, *Landmarks in Armenian History*, 1922; F. Nansen, *Armenia and the Near East*, 1928; A. Abegian, *Neuarmenische Grammatik*, 1936; S. Der Nersessian, *Manuscripts Arméniens illustrés*, etc., 1937; D. Tutaeff, *The Soviet Caucasus*, 1942.

Armenians (Armenian *Hay*), people of Middle-Eastern origin, numbering c. 3,600,000, of whom roughly one-third live in the Armenian Rep. (see ARMENIA), another third live in other parts of the U.S.S.R., and the rest are dispersed in many countries of Asia, Europe, and America (Georgia 390,000, Azerbaijan 360,000, Iran 130,000, Turkey 125,000, Syria over 100,000, France 120,000, U.S.A. 180,000). The Armenian language (q.v.) forms an independent branch of the Indo-European family. A. were christianised in the 3rd cent. AD by St Gregory the

Illuminator; the majority of them now belong to the monophysitic Armenian Gregorian Church, a minority to the Armenian Catholic (Uniate) Church. From ancient times A. have played important roles in the commercial and political life of neighbouring countries and of great empires; e.g. many Byzantine emperors were A. in origin, and the Armenian dynasty of Bagratidae (q.v.) for seven cents. ruled Georgia. Until the end of the 19th cent. the majority of A. lived in the NE. provs. of the Ottoman Empire, but the massacres of 1894-1922 which cost the lives of over 1,000,000 A. led to the present concentration of the Armenian pop. in Transcaucasia. See *Armenian Review*, Boston, Mass., 1948 ff.; J. de Morgan, *The History of the Armenian People*, New York, 1949; S. Atamian, *The Armenian Community*, New York, 1955.

Armentières, Fr. tn in the dept of Nord, on the R. Lys. It was the centre of the heaviest fighting during the final Ger. drive against the Brit. armies in 1918 (see WORLD WAR, FIRST: GERMAN OFFENSIVE OF SPRING, 1918). The tn was completely rebuilt after the First World War. There are textile manufs., including linen, velvet and lace, and breweries and copper industries. Pop. 22,700.

Armeria, genus of tufted perennials, 50 species, family Plumbaginaceae; *A. maritima* is the Sea Pink or Thrift, native to Britain and Europe.

Armfelt, Gustav Moritz, Count of (1757-1814), Swedish general, b. Finland. He showed great courage during the war between Sweden and Russia, 1788-90, and as military representative of Gustavus III concluded the peace of Verela. When Gustavus was deposed A. went into Russian service, and became the first Governor-General of Finland under Alexander I.

Armiak, cloth woven of camel's hair by the Tartars, also a caftan made of A.

Armida, tn of New S. Wales, Australia. It is the centre of a sheep-rearing dist., and the seat of the univ. of New England. Pop. 8860.

Armiger, see ESQUIRE.

Armilla (Lat. 'ring'), bracelet worn by both sexes among the Medes, Persians, Gauls, and Sabines. Both Greeks and Romans looked upon them as feminine adornments, but in some cases of signal merit an A. was conferred publicly upon Rom. soldiers. See BRACELET and REGALIA.

Armillary Sphere. The Lat. word *armilla* signifies a bracelet, and an A. S. is one in which the prin. circles of the heavens are shown by means of metal rings put together in their relative positions. Its use has been superseded by the celestial globe. See GLOBES.

Armin, Robert (c. 1568-1615), comic actor and author, b. Kings Lynn. A pupil of the clown Tarleton, he became one of James I's company of players, and acted the part of Dogberry in *Much Ado About Nothing*. His jest-book, *Fool upon Fool*, was enlarged as *A Nest of Ninnies*,

1608. He also wrote a play, *The History of the Two Maids of Moreclacke*, 1609. His works were ed. by Grosart, 1880.

Arminians, see ARMINUS, JACOBUS.

Arminius (c. 16 BC-AD 21), chief of the Ger. tribe of the Cherusci. He served in the Rom. army, and reached the rank of *eques*. Returning home, he placed himself at the head of the discontented tribes near the Rhine, and completely annihilated 3 Rom. legions under the governor, Quintilius Varus, in the Teutoburg Forest in AD 9. He was subsequently assassinated. A. is regarded as a Ger. national hero and an impressive monument to his memory was unveiled near Detmold in 1875.

Arminius, Jacobus, or Jakob Harmensen, founder of Arminianism, b. in 1560 at Oudewater in S. Holland, studied in the univ. of Leyden, and at Geneva, where his chief theological tutor was Theodore Beza. Appointed minister of a church in Amsterdam on his return, he was chosen to refute a work totally opposed to Beza's doctrine of predestination. He was, however, convinced by the arguments of the work, and on declaring his opinions openly in 1603, he was to the end of his life engaged in a series of bitter disputes with his opponents. A. asserted that God bestows forgiveness and eternal life on all who repent and believe in Christ; Franz Gomar and his party maintained that God had by an eternal decree predestinated which persons should be saved. A. died in 1609.

Armistice, temporary suspension of hostilities between 2 opposing belligerent powers by mutual agreement. It is sometimes concluded for a few hours to allow of a parley, burying of the dead, etc.; a general A. is the usual preliminary to a peace. A general, as opposed to a partial or local A., suspends all military and naval operations of the belligerents and, being concluded by the commanders-in-chief on behalf of their respective govts., requires ratification. The dates of the various A.s in the First World War were: Central Empires-Russia, 29 Nov. 1917; Rumania-Central Empires, 7 Dec. 1917; Central Empires-Ukraine, 9 Feb. 1918; Allies-Bulgaria, 29 Sept. 1918; Allies-Turkey, 30 Oct. 1918; Allies-Hungary, 3 Nov. 1918; Allies-Germany, 11 Nov. 1918. The famous A. of 11 Nov. 1918 was concluded by Marshal Foch and Adm. Wemyss for the Allies with the civil and military representatives of Germany. The allied representatives were, however, acting under the fullest instructions from the Supreme Council in Versailles. This A. was modified sev. times before ratification, and under it the Germans had to evacuate the invaded territories, including Alsace-Lorraine, within a fortnight and fall back to a stated distance beyond the Rhine, thereby establishing a neutral zone, and obviating any possibility of collision between the troops. Germany was to bear the cost of maintaining the armies of occupation in the Rhineland and Alsace-Lorraine. The other primary conditions imposed on Germany included the surrender of 10 battleships, 14 battle

cruisers and light cruisers, 50 modern destroyers, and all her U-boats; also 5000 heavy and field guns, 30,000 machine guns, and 2000 aeroplanes, besides a large quantity of rolling-stock and lorries.

The treaty of Versailles, concluded in 1919, embodied these provisions with, of course, extensive additions. In the forest of Compiègne is an A. monument, situated in a *Carrefour de l'Armistice*, which was unveiled on 11 Nov. 1922. It marks the spot where the Germans signed the A. and bears the inscription: 'Ici le 11 Novembre 1918 succomba le criminel orgueil de l'Empire allemand vaincu par les peuples libres qu'il prétendait asservir.' There exists no similar monument in England, but the Cenotaph in Whitehall serves much the same purpose. In 1940 Hitler, having routed the Fr. armies, forced the Fr. commander, Pétain, to an A., which was signed in the forest of Compiègne on 22 June (regardless of the existence of a Franco-Brit. agreement forbidding the making of a separate A. or peace). This A. was tantamount to unconditional surrender and put the Germans in occupation of the N. half of France and the whole Fr. coast. With a sense of the melodramatic Hitler's plenipotentiaries met those of France in the forest of Compiègne on the same spot, in the same railway coach, as that where Foch had handed his terms to the Germans in 1918. A Fr.-It. A. was signed at a villa near Rome on 24 June. There was no A. at the end of the war. On 14 Mar. 1945 it was announced in Washington that allied military leaders were prepared to accept unconditional surrender of Ger. units of any size but would not enter into any A. or truce. The N. Korean-U.N. forces A. was signed on 27 July 1953.

Armley, since 1926 part of the city of Leeds (q.v.).

Armonica, musical instrument from which the sounds are produced by the friction of moistened fingers on glass or metal tubes, used in the 11th cent., but nowadays a toy. Gluck played it during his visit to London, and Mozart wrote a Quintet with a part for it. There was a later form with a keyboard. The name A. belongs properly to Benjamin Franklin's mechanised form (c. 1762) of the 17th-cent. musical glasses.

Armorial Bearings, general term for heraldic insignia. Strictly speaking, it should be confined to those devices 'borne' on the shield. See HERALDRY.

Armorica, Rom. name for the coastal dist. of Gaul between the Seine and the Loire, roughly the same ter. as the later prov. of Brittany (q.v.).

Armour, Donald John (1869-1933), neurologist and neurosurgeon, b. Cobourg, Ontario; son of a Canadian chief justice and president of the Court of Appeal. He qualified in medicine at London Univ. in 1894 and became a fellow of the Royal College of Surgeons in 1899. Lettsoman lecturer, Medical Society of London, 1927, and president of that body, 1929-30. Wrote *Surgery of the Spinal Cord and its Membranes and Injuries to the Brain and Spinal Cord*.

Armour, Philip Danforth (1832-1901), Amer. merchant and philanthropist, b. Stockbridge, New York. In 1863 he founded the firm of Plankinton, Armour & Co., pork packers, at Milwaukee. In 1870 the firm removed to Chicago and was reorganised as A. & Co., becoming the largest of its kind in the world. A. founded the A. Institute of Technology (since 1940, Illinois Institute of Technology) and the A. Mission in Chicago.

Armour. *Defensive armour* first appeared in the form of the shield (q.v.), made of wood, and carried in the left hand, leaving the right hand free for striking. With the advent of bronze and, shortly after, iron, one finds swords with leaf shaped blades. The means of protection greatly increased; the Greeks had cuirasses of bronze shaped to the body.

The shield of Homeric times was generally large and circular, reaching from the shoulder to the thigh. The Etruscan and Rom. A. was derived from Gk forms, but in Imperial times iron was increasingly used and the legions were furnished with standard equipment. The Rom. shield was often rectangular, commonly of wood, and markedly convex so that it fitted to the body, and the insignia of the legion was shown upon it in metal.



GREEK HOPLITE 5TH CENTURY BC.

From a red-and-black wine cup. Royal Scottish Museum, Edinburgh.

The body A. of a legionary generally consisted of hoops of iron or leather round the body, joined over the shoulders by wide protective braces. The Rom. sword was rather short and two-edged though there was a larger variety known as the *spatha*. After the fall of Rome the barbarians of the Dark Ages wore little body A., and plate A. fell into disuse for some 800 years. The later Romans had used mail, which they had probably

derived from sources outside Europe, and this was increasingly worn by both the Franks and the Vikings. By mail is meant a textile formed of interlocking links, sometimes loosely called 'chain A.'. The great advantage of mail was in its flexibility. From the time of the Norman Conquest both sides were wearing conical helmets with nasals which gave some protection to the face, mail shirts,



KNIGHT WEARING MAIL AND CONICAL HELMET WITH NASAL, 12th CENTURY. WINCHESTER BIBLE.

and, in some cases, mail leggings. The Norman shield was long and kite-shaped for use on horseback; the English had both round ones and kite-shaped ones of the Norman pattern. Footmen had spears and horsemen lances, which were another kind of spear specially light in weight. The feudal system produced a special military caste of heavily armed horsemen. The shield was shortened, a great helm enclosing the entire head was introduced, and the mail protection of the body was covered with a linen surcoat. Helmet, shield, and surcoat, and also the trappings of the horse, were brilliantly decorated by the newly devised art of heraldry, which indicated the wearer's identity.

The disadvantage of mail was that it had not obviated contusion, which necessitated wearing a heavily padded gambeson beneath it. This quilted garment was also sometimes worn as a defence itself. Plate A. began to reappear in the form of pieces to protect the elbow and knee



FIELD ARMOUR, c. 1475. CHURCH OF THE HOLY CROSS, SCHWÄBISCH-GMUND

joints, and soon began to cover the arms and legs. During the course of the 14th cent. plate A. was rapidly developed until, at the beginning of the next cent., the man-at-arms was completely encased in plate, so articulated by means of rivets and straps that it allowed movement of body and limbs. The making of A. has always had something magical about it. In the old days there were the legends of Weyland the Smith, and of Siegfried's sword. In the course of the Middle Ages

the art of the armourer made great strides in the tempering of sword blades and in their decoration. The helmet was equipped with a movable visor, and in place of the mail mittens were articulated gauntlets of plates, the forms of the plates being so fashioned as to give the maximum glancing surface to any blow. With the advent of plate A. the shield fell into disuse in battle, though its heraldic functions survived and it was still used in the tiltyard, and by infantry in war. In the course of the 15th cent. the workshops of S. Germany, such as Augsburg and Nürnberg, produced A. of great elegance, known to-day as 'Gothic' from the details copied from the style of architecture bearing that name, with pointed cusps, finials, and rippled surface. In N. Italy Milan had become the great A.-making centre of worldwide renown. The A. which was produced there in the 15th cent. was more rounded and simpler in form than the Ger. style, but of superlative quality. During the Hundred Years War the skill of the Eng. archer proved that the old feudal horseman was no longer invulnerable, and a cent. later the introduction of firearms was a further blow to the man-at-arms. On the other hand, the tournament continued to flourish and was regarded as the best training for warfare of the military caste. Firearms, which had begun in the form of cannon, were later reduced in size to become portable. They were in the beginning expensive and required trained men to use them, but it was firearms which won the final battle of the Hundred Years War in 1453, though it was a long time before A. and the old hand-weapons were given up. In the course of the 16th cent., when Europe was torn by the rivalry of the Emperor and France, and later by the wars of Religion, organised armies with specialised corps were put in the field. The infantry had never been heavily armed for obvious reasons, and one finds the use of professional mercenaries such as the *Landsknechts*, equipped with spears, hauberks, and swords, and wearing partial A. The old heavy cavalry was still used, but more to deliver the final blow than to manoeuvre. For this purpose light cavalry wearing half-A. was employed. The makers of A. were still busy making fine period A., magnificently embossed in the style of the Renaissance and damascened with gold and silver, and also A. specially designed for the tournament.

The number of *offensive* weapons is legion, but they can be divided under three heads: (i) swords and daggers; (ii) staff weapons, which include spears, lances, halberds, partisans, glaives, pole-axes, etc.; (iii) projectile weapons: bows and arrows, slings, and of course firearms. The precursors of cannon were the siege machines, shot by means of a counter-balance or by taution, which date back to remote antiquity, and also the catapult, ballista, the medieval trebuchet, and the mangonel, whose middle syllable is the origin of the word *gun*.

Defensive armour was worn in Europe

for the last time during the first half of the 17th cent. In the Thirty Years War the cuirassiers, or heavy cavalry, played an important part, but were quickly abandoned in the Civil war in England. Bodies of disciplined pikemen carrying long pikes and wearing defensive A. of long pikes and wearing defensive A. of helmet, breast- and back-plate, and tassets on the thighs, and horsemen wearing a helmet of iron, a cuirass, and a coat of stout buff leather, were employed by both sides. After the Civil war A. was virtually abandoned in favour of cloth uniforms, and the pike was combined with the musket with the invention of the bayonet, which made for great economy in tactics. Nearly 300 years later A. made its appearance again in the form of the steel helmet introduced in 1916 during trench warfare on the Western Front, and some months later in the armoured vehicle known as the tank. In the Second World War body A. was being supplied to Amer. Army airmen in the form of 'flak jackets' or vests—light but strong A. Made in 2 sections, the jacket covered back and front from neck to waist, and it was of fabric, with squares of 20-gauge manganese steel sewn in so that they overlap on all sides, giving complete coverage of chest and neck. The vest would resist a .45 bullet at 30 ft. See ARMS; MAIL; ARMOUR; SHIELD; SWORD; and articles on other individual weapons.

Armoured Cars are the fastest offensive vehicles of a land force, being capable of about 45 m.p.h. on roads and about 25 m.p.h. cross-country. They are armed with a 2-pounder gun and a machine-gun. An armoured car regiment is allotted to each armoured div. and to each corps. A regiment consists of H.Q., H.Q. squadron, and 4 squadrons with their services. The main purposes of an armoured car regiment are reconnaissance ahead of forward troops, the covering of an exposed flank, offensive action in pursuit, and independent raiding.

Armoured Corps, Royal, formed in April 1939, when it consisted of 18 cavalry regiments and all the units of the Royal Tank Corps, which later was renamed the Royal Tank Regiment. Most of these cavalry regiments had already been mechanised, and their incorporation in the R.A.C. confirmed the permanent substitution of the internal-combustion engine for the horse. Strictly the hist. of the R.A.C. begins only in 1939, but its very existence is due to the tank and armoured car, which had records dating from the First World War, and indeed sev. of the regiments now forming part of it first saw service more than 250 years ago. In 1927 an 'Armoured Force' was formed on Salisbury Plain, made up of a reconnaissance group of tankettes and armoured cars, a main group of about 50 medium tanks, supporting artillery, a machine-gun battalion, and Royal Engineers and signal services, but not all armoured. This force was the first armoured formation, and on its work were founded the principles in use throughout the R.A.C. in later years. The conversion of the 11th Hussars and

the 12th Lancers in 1928-9 into a 'cavalry armoured car regiment' was the forerunner of wholesale conversion 10 years later, when only the Household Cavalry, 1st Royal Dragoons (converted into an armoured car regiment during the Second World War), and Scots Greys remained horsed cavalry. The formation of the R.A.C. was announced immediately after this conversion, thus concentrating all the armoured units of the Army into one corps. The 10 years' delay was regrettable but was due to constantly changing tank design and tactics, parl. refusal to incur heavy military expenditure, and prejudice in favour of the horse. When the bulk of the cavalry regiments were converted, some were mechanised as light tank regiments, and some as 'mechanised divisional cavalry regiments.' The latter performed the role of the old horsed divisional cavalry—i.e. primarily that of reconnaissance and holding ground for short periods—and, for these duties, they were equipped with light tanks and scout carriers very similar to the later Bren-gun carriers. After the Dunkirk evacuation in 1940 these divisional cavalry regiments were not re-formed as such. In Mar. 1940 it had been decided to group them into 'Armoured Reconnaissance Brigades,' and when the B.E.F. advanced into Belgium these regiments, preceded by armoured cars, led the advance. But after Dunkirk their duties were performed by battalions of the Reconnaissance Corps. Armoured cars were widely used in the First World War, and formed the nucleus of the 'Light Armoured Motor Batteries' of the Machine-Gun Corps, which operated mainly in the Middle E. Later they became incorporated in the Armoured Car Companies of the Tank Corps when it was reorganised after the war. In the period before the Second World War almost all the Brit. armoured cars were in India, and saw service on the NW. Frontier. The R.A.F. also used them with advantage in Iraq. The 1st Royal Dragoons (armoured car regiment) played a very notable part in the operations in the W. Desert in 1941-2 and in Tunisia. The Queen's Bays (tanks) also rendered effective service with the Eighth Army and, later, with the First Army against the Axis forces in N. Africa. The fact that no invasion of Britain took place in 1940 enabled the War Office to proceed with mechanisation and motorisation. Thus many of the units re-formed after Dunkirk became 'motor-machine-gun regiments,' and later the motor-machine-gun brigades became armoured brigades, and very soon new armoured divs. were in existence. Some of these armoured forces fought with great success in Libya, Greece, Burma, and elsewhere. When the R.A.C. was formed the Royal Tank Regiment retained its corps badge. The badge of the R.A.C. is a mailed fist in a plain circular frame, with a crown at the top. See J. R. W. Murland, *The Royal Armoured Corps*, 1943.

Arma, offensive weapons used in warfare. The cross-bow (q.v.), or arbalest, came into England with the Normans,

and consists of a steel bow released by a trigger, the whole being set on a wooden stock. Its use, forbidden to Christians by Rome, was antecedent to that of the long-bow. The first firearms (q.v.) were introduced to England in the 14th cent., breech-loading cannon being the earliest form, with projectiles of shaped stone. The hand gun was little known until 2 centuries later, and then was so heavy as to require a stand. The early forms were fired by a slow-match applied to the touch-hole, and in many respects resembled the cross-bow. These were improved by the invention of the match-lock and again by the wheel-lock and snap-hance, or flint-lock. In these forms the gun remained in use until 1807, when Alexander Forsyth patented the percussion-lock; there followed the needle-gun, and the breech-loading rifle superseded the old muzzle-loading system; then came magazine rifles. Rifling, which was an old patent, became customary when the advent of machinery made accurate manuf. easy. Pistols and revolvers are the result of guns being modified for cavalry, and their advancement is generally concurrent with that of guns, the same principles being applied. The idea of the machine-gun can be traced back to the 15th cent., when numbers of muskets mounted side by side were used for defensive purposes. Many forms of this gun were found, but the first single barrel machine-gun was made by J. Puckle in 1722. It fired 63 times in 7 minutes. It was, however, an American, R. J. Gatling, who in 1862 produced the first really successful battery or machine-gun, firing from 4 to 10 barrels which rotated round a central axis. By 1876 this gun was capable of firing 700 rounds per minute. The Gatling was followed by the Fr. Montigny mitrailleuse, the Gardner, and the Nordenfeldt, all of which employed the multi-barrelled system, and were hand-operated. The Maxim gun, introduced in 1883, was the first type of single-barrelled automatic gun, followed by the Hotchkiss, the Vickers, the Lewis gun, and many others during the first quarter of the 20th cent. Almost every country has now developed some form of heavy and light machine-gun of its own type. The latest developments in A. include the rifle-grenade discharger, the self-loading rifle, and machine-guns of larger calibre for use against tanks and armoured vehicles.

Artillery A. have developed from the metal cannon firing rough projectiles to the powerful weapons of the world wars period, consisting of guns and howitzers capable of firing explosive shell at long range with great accuracy, and since the Second World War there has been yet a further development—the atomic cannon, already in use in the U.S. army. *See also* FIREARMS.

Arms, Coats of, ensigns or armorial bearings, are the distinguishing devices used to denote particular families, corporate bodies, kingdoms, etc., throughout the world. Though originally assumed at will by the bearer, they are now granted

in Great Britain and the Commonwealth by the College of Heraldry.

Armstead, Henry Hugh (1828–1905), sculptor, b. London, educ. at Royal Academy under Bailey, Leigh, and Carey; became an R.A. 1879. His work includes part of the frieze at the base of the Albert Memorial, carved oak panels in the robing room at the New Palace of Westminster, the effigies of Bishop Wilberforce at Winchester and Lord John Thynne in Westminster Abbey, and a marble statuette of 'Remorse,' now in the Tate Gallery. *See* life by C. W. Armstead, 1906.

Armstrong, Archibald, or Archy (d. 1672), court jester to James I and Charles I of England. He greatly disliked Buckingham and Archbishop Laud, and, in the presence of the latter, said the following grace, 'Great praise be given to God and little Laud to the devil.' Charles I later dismissed him from court, and he eventually retired to Arthuret, Cumberland.

Armstrong, John (1709–79), poet and physician, b. Castleton, Roxburgh. Educ. at Edinburgh Univ., he practised in London. He is remembered as the friend of Thomson, Mallet, and other literary celebrities of the time, and as the author of a poem on *The Art of Preserving Health*, 1744, in which a somewhat uncompromising subject for poetic treatment is gracefully and ingeniously handled. His other works, consisting of some poems and prose essays, and a play, *The Forced Marriage*, are forgotten, with the exception of 4 stanzas which he contributed to the end of the first part of Thomson's *Castle of Indolence*, describing the diseases incident to sloth.

Armstrong, Samuel Chapman (1839–93), an Amer. soldier and philanthropist, b. in the Hawaiian Is., son of missionary parents; served on the Union side in the Civil war, and acquired distinction as a commander of Negro troops. Founded the Hampton Normal and Industrial Institute in 1868.

Armstrong, Sir William George, 1st Baron (1810–1900), engineer, b. Newcastle upon Tyne; he was articled to a firm of solicitors and afterwards became a partner. His tastes, however, lay elsewhere, and, in 1840, he produced an improved hydraulic engine, and, 2 years later, a hydro-electric machine. In 1845 he invented the hydraulic crane. The next year he founded the Elswick engine-works (Newcastle); later, when joined by Whitworth, the Armstrong-Whitworth Co. (*see* VICKERS and WHITWORTH). Here he commenced the manuf. of the A. rifled cannon (which he invented) and other ordnance, in which he was very successful. In 1858 he was knighted, and shortly afterwards appointed chief engineer of rifled ordnance under gov., which position he retained till 1863, when he returned to Newcastle. In 1887 he was created a peer with the title of Baron A.

Army. *General Sketch of the History of Armies.* Evidence derived from all periods of hist. shows that more or less organised A.s have played a prominent

part in the hist. of their countries. The early oriental nations, such as Egypt, Assyria, and Persia, all possessed large A.s, which were easily raised and placed in the field in time of war. Standing A.s were unknown, except in so far as rulers employed special corps of picked soldiers to act as their bodyguard and to form a nucleus for an A. in time of war. The earliest A. of which we have any record is that of the Egyptian Rameses II (c. 1300 BC), who is supposed to have conquered W. Asia to the boundaries of India with an A. of more than 1 million men. To him also is ascribed the formation of a warrior caste, the members of which had to serve in his A.s when necessary, had certain of the taxes remitted as a kind of retaining fee, and were also granted military fiefs. Herodotus (vii. 19 ff.) describes the A. gathered together by Xerxes, and which, according to his computation, numbered well over 2 million men. It took full 4 years to mobilise.

Egyptian and Persian military science was well advanced, and the method of raising an A. on a system of quasi-conscription was introduced by the Egyptians. The principles of attack and defence were elaborated by the A.s of Assyria. The hist. of Gk A.s falls into sev. well-defined periods. In the first of these, A.s assembled round their leaders, in what was practically a feudal levy. The Grecian A. before Troy can be taken as an example of this. In the latter days of Gk hist. conscription was normal. Every citizen of Athens had to serve in the A. and had to undergo military training during a given period, after which he was placed in a certain reserve section of the A., and was liable to service when called upon. In many cases military service formed the basis for political gov. The A. was divided into infantry and cavalry, the greater part of the pop. serving as infantry, while the richer men formed the cavalry. For some very long period, however, the cavalry was a very secondary part of the Gk A. In Sparta every man was compelled to serve between the ages of 18 and 60, the military training being much more severe than elsewhere. Gk A.s were composed of hoplites, cavalry, and light-armed troops formed principally from mercenaries. During the 4th cent. BC they underwent considerable change. Hitherto they had been national levies; henceforward they consisted chiefly of mercenaries. The expedition of the Ten Thousand was the first expedition of a purely mercenary A.; hence warfare became a trade, in which only specially trained and paid soldiers took part. The free soldiers of Greece declined more and more, until we find the mercenary element alone represented. The most important development in Gk military science was the phalanx. This was a formation of parallel lines drawn up in a dense and practically impenetrable mass. The early phalanx had about 6 to 8 lines of men, the later development—the Macedonian phalanx

—consisted of 16 columns of soldiers armed with Macedonian pikes about 24 ft long, drawn up in close order. The Macedonian A. of Philip was probably the second standing A. of the world.

Meanwhile the Rom. A. was on the way to becoming the most perfect form of military organisation in the world. The Roman, like the Greek, was, as a citizen of the rep., bound to serve the commonwealth as a soldier. All Rom. citizens between the ages of 18 and 46 were bound to serve in the A. They received a good military training during their early military career, and for the first few years they served with the *juniores* or active A., afterwards passing to the reserve (*seniores*), where they continued their service until they reached the age limit. The richer citizens became members of the cavalry, but the greater part of the A. was composed of infantry. During the periods of active service the soldiers received pay. The A. was organised into legions, which in turn were subdivided into cents, and maniples. The sections were commanded by military tribunes, who took their orders from the consul or propraetor. Up to the time of Marius (q.v.) the Rom. A. was recruited purely from the Rom. rep.; but thereafter the recruiting areas were extended to the whole of Italy and beyond, while the cohort became the tactical unit. Augustus estab. a permanent A., the greater part of which was stationed on the frontiers of the empire. In its best days the Rom. A. excelled all others from the point of view of discipline and *esprit de corps*; but its quality gradually declined. The free citizen of Rome no longer regarded it as an honour to form part of the legion; the frontier of the empire was guarded by troops stationed in one particular place and recruited from the inhab. of that country. Barbarians began to assume an important place in the legions, and the power of the Rom. A. passed into the hands of barbarian mercenaries. Not only had this a grave effect on the A. itself, but it had grave repercussions in the political field and hastened the downfall of the empire.

The Teutonic A.s which overran the Rom. dominions were essentially nations in arms. It was the privilege of the freeman to bear arms. None but a freeman could do so, and then only when he had been pronounced worthy of the honour by the chieftain of his 'clan.' These chieftains were invested with absolute power as long as the war continued, but laid it down as soon as peace was declared. From a system of clan warfare to one of feudal warfare was not a far step. Warriors who fought on terms of equality naturally demanded an equal share of the conquered ter. The chieftains divided the conquered lands amongst the warriors of the victorious A.s, and from this beginning most historians have traced the gradual rise of the feudal system. The discipline of the 'barbarian' A.s was largely obtained from the Rom. A. Prisoners of war and deserters from the Rom. A. afterwards fought in

the barbarian ranks, and in this way the discipline of Rome was rudely learnt. The A.s were almost entirely composed of infantry, which was divided into light-armed forces which fought in conjunction with what cavalry there was, and the heavy infantry which fought in a wedge-shaped formation, and on which fell the greater burden of the fighting.

The system of 'commendation' was common amongst the Ger. tribes; the young men of good birth commended themselves to some chieftain and became his men. They formed his bodyguard in time of peace, the nucleus of his A. in time of war. Gradually this idea spread, and many small landowners commended themselves to the 'lord,' and in return for his protection rendered certain services to him. When ter. was conquered the land was divided by the lord among his followers, and in the course of time he demanded as a return for these gifts an absolute supremacy over their property and persons. Under the early Carolingian kings we have the transition period—the period when the national A., i.e. the nation in arms, and the feudal A. work together; but under the greatest of the Carolingians, Charlemagne (q.v.), we find the full feudal system in force. From this time until the feudal A.s the national A. disappears, and the baronial militia takes its place.

The feudal levy was the gathering together of the lord, his men-at-arms, and his other dependants and retainers. The A. was no longer composed of national levies, but was divided roughly into cavalry and infantry, which div. represented a social as well as a military difference. The lord and his men-at-arms—the cavalry—represented the nobility; the peasant and the serf—the infantry—the poor of the estate. There were many drawbacks in a feudal A. In the first place, service was restricted. Forty days to 3 months in the year was the longest service which was given, and after that the A.s disbanded. Further, no developments took place in military science; true, the barons and the knights improved their armour and their weapons, but always at the expense of the infantry, whom it was policy to keep ill armed and badly equipped. Dependence was placed almost entirely upon the heavy cavalry charge, a charge which swept all before it, until, by a development of tactics (see STRATEGY AND TACTICS, *Military*), it was shown that it could be met and overthrown by infantry and archers. The crusaders gave rise to new tactical systems, which showed that the day of the heavy cavalry charge was over. The battles of Falkirk (1298) and Bannockburn (1314) were both examples of the new development. The combination of missile and shock tactics employed by Edward III and Henry V showed that the feudal cavalry of France was *ofete*. The methods of raising an A. adopted by Edward III showed that the beginning of the end of feudal levies was in sight. Scutage had led to the employment of mercenaries. Edward III employed

mercenaries on a large scale; kings could depend on mercenary A.s, and could with their aid overthrow feudalism. There were similar trends on the Continent; the fns were enfranchised and raised militia forces, while the invention of gunpowder still further weakened the old-fashioned organisation. Henry V had used artillery before Harfleur, but it was not until the end of the 18th cent. that artillery became really effective.

The decline of feudal A.s was followed almost immediately by the rise of standing A.s. The earliest example of a standing A. in Europe is the formation of the Turkish corps of janissaries in 1362. For a cent. this remained the only standing force; but after the Swiss infantry had proved that they were more than a match for the Burgundian cavalry, and when Charles VII had won repeated victories over the English, a standing A. was created in W. Europe. A force of about 9000 men was raised by Charles VII and divided into *compagnies d'ordonnance*, which were to remain in existence even in times of peace; a few years later a larger force of infantry was raised by the same king. A standing A. gave an overwhelming advantage to the king; and got rid of the necessity of employing mercenaries, who were as much a disadvantage to their employers as they were a check to the enemy. This example was soon followed by other European powers, and the practice of calling out the feudal levy practically ceased from this time. Firearms began to appear in increasing numbers until by the middle of the 17th cent. there were twice as many musketeers as there were pikemen. The method of raising a standing A. was similar to that already used by Edward III. The duty was entrusted to the great nobles, and in this way there originated the Brit. regimental system. The noble destined to command a regiment was given a certain sum wherewith to recruit it, and was also allowed an ann. sum for its maintenance. At first mercenaries were very largely employed, but later the A. became to a very great extent a national and *voluntary* A. The improvement in arms led to improvements in military science, and to the development of the art of war. Under Gustavus Adolphus and Wallenstein (q.v.) great changes were brought about, and instead of the *mêlée* of feudal warfare we find an organised system of military tactics which depended very largely upon the organisation of the military units.

The campaigns of Louis XIV led to the formation of the larger divs. and brigades. Under Frederick the Great (q.v.) we have the beginnings of strict military training and discipline, which made Prussia a first-class military power. The Fr. Revolution, however, brought with it a fundamental change in the methods of raising an A. The bloody wars from which France had emerged victorious by 1797 had led to a serious draining of her resources. In 1798 the law of conscription was brought forward. By this law every citizen was bound to serve in the A.s of France. The whole Fr. pop.

between the ages of 20 and 25 was immediately enrolled, and became liable to service when called upon. To this scheme was due to a very large extent the success of Napoleon. It followed, then, that if the other nations of Europe were to keep their positions as powers they must adopt a similar plan, and at the present time all the continental powers have conscripted A.s; Great Britain alone maintained her voluntary A. until 1939, when, owing to increasing tension throughout Europe, a limited measure of conscription was introduced. From the Prussian A. came further developments: A.s were raised and trained for a year, being then sent back to their homes as a reserve force, liable to be called upon when necessary. The system proved successful, and with the battle of Sadowa (1866) it proved so effective that the system of a reserve A. and a short-service system was taken up by practically every power. Most nations now have 3 lines of service, a standing A., a reserve A., and a second line of reserve, a militia, or similar force formed on a territorial basis.

See BRITISH ARMY (and further cross-references at the end of that article) for modern developments in the U.K.; see also RED ARMY; UNITED STATES ARMY; and sub-headings *Defence* in the main articles of the countries of the world.

Army Emergency Reserve, see RESERVE ARMY.

Army News Services. The occupation of the Rhineland by Brit., Fr., and Amer. armies after the First World War saw the estab. of the first modern news-sheets printed by and for the troops. The Brit. Rhine Army newspaper, the *Cologne Post*, was the first issued as a daily, in Mar. 1919. When the Brit. army moved to Wiesbaden, the paper was re-estab. there as a bi-weekly, ceasing pub. in Nov. 1929. Its big 'scoop' was the printing of the text of the prin. clauses of the Versailles treaty.

In the Second World War the earliest attempts to provide newspapers for the forces were in the W. Desert, where the Eighth Army had its own paper, *Eighth Army News*, and in Algeria, where the First Army started *Union Jack*. These were produced by journalists serving with the forces and followed up the troops as they advanced, being printed on local presses where possible. At the end of the war there were some 15 army papers between them covering all theatres of operation. They included, apart from those listed above, *Parada* (in Italy, pub. in Polish, for the Polish Army); *Contact* (India); *S.E.A.C.* (South-east Asia Command); *B.C.O.N.*, later *Japan News* (Japan); and *Mid-East Mail* (Palestine, Transjordan, Syria). The last paper to cease pub. was *Union Jack*, at Athens in July 1948. The Amer. Army also ran an extensive news service for its troops in Europe and Asia.

Since the Second World War no Brit. Army newspaper has been printed, but numerous news-sheets have supplied troops abroad with information of international, local, and sporting events. The

best-known of these is *Circle News* (later known as *Crown News*, produced for Commonwealth troops in the Korean theatre, and still (1957) being pub.).

Army-worm, or *Leucania unipunctata*, is the larva of an insect of the order Lepidoptera and family Noctuidae, which receives its name from its habit of marching in great numbers. It does much damage to Amer. crops. The final stage of its life occurs when it becomes a nocturnal moth.

Arnaldus de Villa Nova, see ARNOLDUS.
Arnarson, Örn, see STEFANSSON, MAGNÚS.

Arnatta, see ANNOTTO.

Arnaud, Arsène, see CLARETIE, JULES.
Arnaud, François Thomas Marie de Baoulard d' (c. 1718-1805), Fr. writer and dramatist, b. Paris. His literary merit attracted the attention of Voltaire, by whom he was recommended to the King of Prussia. He was for a time at the court in Berlin, but returned to Paris the year before the outbreak of the Seven Years War (1755). During the latter part of his life he lived a life of great poverty and misery. His chief works are the melodramas *Le Comte de Comminge*, 1764, and *Euphémie*, 1768, and the novel *Les Délassements de l'homme sensible*, 1783-93.

Arnaud, Henri (1641-1721), Fr. pastor and general of the Vaudois of Piedmont, b. Embrun. He was educ. at La Tour, and later at Basel and Geneva. He was later appointed pastor at the vil. of La Tour. After the expulsion of the Waldenses (q.v.) by Victor Amadeus of Savoy he became their leader, and in 1689 he led the expedition which was to attempt 'la glorieuse rentrée.' After encountering almost unsurpassable difficulties, they were besieged during the whole winter by the French and the Savoyards; but in 1690 the Duke of Savoy became an ally of William III of England and for the next few years A. and the Waldenses helped the allies to fight the French. At the end of the war the duke turned against the Waldenses again, and they were forced to leave the country. About 3000 of them followed A. into exile in Germany. He visited England about 1707. He d. at Schönenberg. During his exile he wrote his *Histoire de la glorieuse rentrée des Vaudois dans leurs vallées*, which was trans. into English in 1827.

Arnaud de Cervole (d. 1366), Fr. brigand chief, b. Périgord, who fought with King John at Poitiers in 1356, and with him was taken prisoner. On his release he returned to the S. of France and held Pope Innocent VI to ransom. He was assassinated by one of his followers.

Arnaud de Villeneuve, see ARNOLDUS.

Arnauld, Angélique de St Jean (c. 1624-1684), nun at Port Royal who was elected prioress in 1673, and by her piety and courage set an example to all the sisters during the Jansenist controversy. She was abbess from 1678 until her death. She wrote *Mémoires pour servir à l'histoire de Port Royal* and literary pictures of her 2 famous aunts.

Arnauld, Antoine (1612-94), twentieth

and youngest son of Antoine A., famous Fr. lawyer. He is usually distinguished by the name 'le grand A.' Originally intended for the Bar, he chose rather to study theology. He became a Jansenist, and his book, *De la fréquente communion*, raised an uproar that forced him into hiding for 20 years. His letters, *A un duc et pair*, an outspoken attack on Jesuit methods, elicited the famous *Lettres provinciales* of Pascal, but these failed to save A. from being solemnly expelled from the Sorbonne and degraded, 1656. The 'Peace' of Clement IX suspended attacks on Jansenism, and A. emerged from retirement, to be graciously received by Louis XIV. In *La Perpetuité de la foi* he now defended transubstantiation and attacked Calvinistic doctrines. His submission proved external only, and when Jansenism (q.v.) was condemned by Alexander VIII in 1690, A. fled to Holland. There he conducted controversies with Jesuits, Protestants, and even with Malebranche. The *Art de penser* (Port-Royal Logic) was written in conjunction with Nicole (q.v.), and remained a text-book until recently.

Arnault, Antoine Vincent (1766-1834), Fr. poet and dramatist, b. Paris. Almost immediately after starting his dramatic writings he was successful with his tragedy *Marius à Minturnes*, 1791. He left France during the Terror, but returned and was arrested, and for a short time imprisoned. He was patronised by Napoleon and remained faithful to him during the Hundred Days. Because of this he remained in exile until 1819. Ten years later he was again elected to the Academy and in 1833 became secretary. Among his works may be mentioned *Blanche de Montcassin*, 1798, *Fables*, 1812, and *Souvenirs d'un seigneur*, 1833.

Arnaut, Daniel (c.1180-1210), Provençal poet, b. Ribérac, Dordogne. His name remains to us as that of the greatest of troubadours, owing to the praise bestowed upon him by Dante. He seems to have been a knight of Périgord, who attached himself as a troubadour to the court of King Richard I of England. He was a great composer of love songs, and both Dante and Petrarch are loud in their praises of the *sestina*, a poetic form which he invented. His versification is complicated and to-day it is difficult for us to understand the admiration which it once excited. See V. A. Canello, *La Vita e le opere del trovatore Arnaldo Daniello*, 1883.

Arnaut, Turkish and Serbian word meaning a native of Albania; an Albanian.

Arnaut de Mareuil (fl. 1180), Provençal troubadour who settled at the court of Toulouse. By his passionate songs addressed to the Countess Adalasia he roused the wrath of his rival Alfonso II of Aragon and was forced to flee into exile. He probably d. before the end of the 12th cent. See R. C. Johnson, *Les Poésies lyriques du troubadour A. de Mareuil*, 1935.

Arndt, Ernst Moritz (1769-1860), Ger. poet and patriot, the son of an emancipated serf. Intended for the ministry, he renounced it, and led for some time a wandering life. In 1803 he pub. *Versuch*

einer Geschichte der Leibeigenschaft in Pommern und Rügen, a hist. of serfdom which led to its abolition in 1806 in Pomerania. In 1806 he issued the famous call to the Germans to throw off the yoke of France, and such excitement did it produce that he was forced into exile in Sweden to escape Napoleon. In 1810 he wrote pamphlet after pamphlet full of hatred of the French, and pub. 2 vols. of patriotic songs (1813-15). In 1818 he was appointed to the univ. at Bonn, and threw himself into the movement for constitutional reform. He was elected to the Ger. Diet in 1848. A monument in his honour was erected at Bonn in 1865.

Arndt, John (Johann) (1555-1621), Lutheran divine, b. Ballenstädt in Anhalt; studied theology under Lutheran teachers. Among his mainly mystical and devotional works is his *Wahres Christenthum* (True Christianity). In this he balances Christ's life in His people with the main Lutheran doctrine, His death for His people.

Arne, Thomas Augustine (1710-78), composer, b. London and educ. at Eton. He was the son of an upholsterer and was intended for the Bar, but his love for music decided his career. In 1733 he produced his first opera, *Rosamond*, in which his sister Susannah Maria, afterwards the famous Mrs Cibber, took the principal part. He wrote music for Fielding's *Tom Thumb*, Congreve's *Judgment of Paris*, Milton's *Comus*, and Thomson and Mallet's masque, *Alfred*. In the last-named appeared the famous 'Rule, Britannia.' In 1744 he was appointed composer to the Drury Lane theatre. In 1746 he supplied music for the masque *Neptune and Amphitrite* and the songs in *The Tempest*. He composed 2 oratorios, *Abelard and Judith*. He was made a Mus. Doc. in 1759. He afterwards became famous as a music teacher. He was buried at St Paul's, Covent Garden. A's dramatic works are very numerous, but except *Arlaxerxes* and the It. *L'Olimpiade* are rarely operas properly speaking. He also wrote some church music, cantatas, odes, overtures, concertos, sonatas, and songs. His son Michael (c. 1740-86) was also a composer, mainly for the stage.

Arnee, native name of the *Bos bubalus*, or *Bubalus arni*, a buffalo found in the W. Indies. It has large horns and is of great size.

Arnheim, Johann Georg von, see ARNIM.

Arnhem, cap. of the prov. of Gelderland, Netherlands. It is situated on the Lower Rhine, 35 m. ESE. of Utrecht. Its surroundings are extremely beautiful. The chief manufs. are cotton and woollen goods, soap, carriages, and tobacco. A. was a member of the Hanseatic League. Sir P. Sidney d. here in 1586. The tn suffered considerable damage in the Second World War. First Allied Airborne Div. landed here 17 Sept. 1944. After 9 days' heroic stand 2000 men were brought back, with heavy losses to the div., on 26 Sept. Brit.-Canadian troops captured A. in April 1945. See WESTERN FRONT IN SECOND WORLD WAR. Pop. (1954) 116,420.

Arnhem Land, reservation for aborigines in the N. of N. Ter., Australia, area about 31,200 sq. m., comprising the region between the Gulf of Carpentaria and the Timor Sea. Cape A. is on the extreme NW. of A. L., on the Gulf of Carpentaria; A. Bay is an inlet of the Arafura Sea on the E. of the N. coast of A. L.

Arni, see ARNEE.

Arnica, genus of Compositae found in cold and temperate climates. *A. montana*, the Mountain Tobacco, perennial herb, common to Alpine woods, contains an acrid resin and a volatile oil.

Arnim, Bettina von (1785-1859), Ger. authoress, the sister of Clemens Brentano. In 1807 she made the acquaintance of Goethe, for whom she had a great attachment. She married in 1811 the writer Ludwig Achim von A. (q.v.). Her most famous pub. was the *Goethes Briefwechsel mit einem Kinde*, 1835. This purported to be a correspondence between herself and the poet, which was at first believed to be authentic, but was later proved to be to a great extent fictitious. She also wrote on political and social questions.

Arnim, Elizabeth Mary, Countess von (later Countess Russell) (1866-1941), Brit. authoress, b. Sydney, Australia, daughter of H. Herron Beauchamp, was a cousin of Katherine Mansfield (q.v.). While married to Count August von Arnim, who d. in 1910, she won popularity with *Elizabeth and her German Garden*, 1898, containing amusing sketches of her domestic life. It was followed by *The Solitary Summer*, 1899, and *The Adventures of Elizabeth in Rügen*, 1904. 'Elizabeth,' as she signed herself, became widely known for the lively wit of her writing. In 1916 she became the third wife of the second Earl Russell, but they separated in 1919. Her later novels include *The Enchanted April*, 1922, *Introduction to Sally*, 1926, *The Jasmine Farm*, 1934, and *Mr Skeffington*, 1940. *All the Dogs of My Life*, 1936, is an autobiography.

Arnim, or Arnheim, Johann Georg von (1581-1641), Ger. soldier, b. Brandenburg. He served under Gustavus Adolphus in 1613, and in the Polish army, and in 1626 entered the imperial service under Wallenstein. In 1630 he left it for that of the elector of Saxony, and commanded part of his army at Breitenfeld in 1631. He took part in the negotiations between the elector and Wallenstein during 1633-4; and defeated the Imperialists under Colloredo at Liegnitz, 1634. D. at Dresden while leading the Imperial and Saxon forces against the French and Swedes.

Arnim, Ludwig Achim von (1781-1831), Ger. poet and novelist, b. Berlin. He received a scientific training, but his natural tendency was towards literature, with a fondness for romance and the supernatural. He collected old popular legends and songs in travelling through Germany, which he pub. in collaboration with his friend Clemens Brentano in 3 vols., entitled *Des Knaben Wunderhorn*, 1806-8. Other works were *Arnul, Reich-*

tum, Schuld und Busse der Gräfin Dolores (a novel), 1810, *Halle und Jerusalem* (dramatic romance), 1811, and *Isabella von Aegypten*, 1811. In 1817 he pub. a historical romance, *Die Kronenwächter*. A.'s importance lies chiefly in having discovered the treasure of folk poetry.

Arnim, General Sixt von (1851-1930), Ger. general. In the final Ger. offensive, begun Mar. 1918, he commanded that one of the 7 armies which occupied the line from the sea to the R. Lys. His objective was, in conjunction with Gen. von Quast, commanding from the Lys to Arras, to thrust back the Brit. First Army under Gen. Horne upon the Brit. armies which were in retreat to the Aune and so isolate the Second Army under Gen. (later F.M.) Plumer. He took Mont Kemmel (24-6 April) by violent frontal and flank assaults, but his losses were so severe that he was unable to secure other hills belonging to the same system, and so could no longer jeopardise Ypres. This failure, together with that at Hazebrouck, was the beginning of the end of the great Ger. thrust of 1918.

Arno, riv. of Italy, which rises on Mt Falterona in the Apennines (q.v.), 25 m. N. of Arezzo (q.v.). It flows generally W. for 150 m. to the Ligurian Sea, which it enters 7 m. after passing Pisa (q.v.). At Florence (q.v.) it is 400 ft wide, but it can be forded in summer. It flooded disastrously in 1537 and 1740. There was bitter fighting around the A., near Florence, July-Sept. 1944, during the Second World War. See further under ITALIAN FRONT IN SECOND WORLD WAR.

Arnobius (fl. c. 300), teacher of rhetoric at Sicca Venerea in Numidia. In the first decade of the 4th cent., soon after his conversion to Christianity, he pub. his celebrated work *Adversus Gentes*. This was intended as an answer to the pagan allegation that contemporary disasters were due to the impiety of the Christians; its tone is bitter and ironical, but the author was not at that time well grounded in Scripture. See the ed. of A. Reifferscheid in *Corpus Scriptorum Ecclesiasticorum Latinorum*, 4, 1875.

Arnold, Benedict (1741-1801), Amer. general and traitor, b. Connecticut. A. joined the Amer. Army in the War of Independence and distinguished himself in the battles of Ticonderoga and Quebec. He reached the rank of major-general and was one of the most trusted officers of Gen. Washington, although he had previously been much embittered by the promotion of sev. officers of junior rank over his head. But he continued at his post, fought at Ridgefield and Saratoga, was commander at Philadelphia in 1778 and then put in charge of the all-important post of W. Point on the Hudson R. in 1780. A court martial resulting from disagreements with civil authorities, although he was cleared of all serious charges, apparently led to his entering upon communication with the Brit. command for the betrayal to them of his post. A young Brit. officer, Maj. John André, was sent to meet him. André was captured and hanged as a spy, but A. escaped to the Brit. lines, where he

received a command and fought against his fellow countrymen. He sailed for England in 1782, where he lived more or less in obscurity. Eventually he d. in London, a disappointed and embittered man.

Arnold, Edward Augustus (1857-1942), Eng. publisher, only son of the Rev. Edward Ponrose A., he was thus a grandson of Thomas A. of Rugby, and a nephew of Matthew A. and of Mrs Humphrey Ward. He was educ. at Eton and Hertford College, Oxford. After learning publishing for some years with the firm of Richard Bentley, he started his own business in 1890, at first in Bedford St, Strand, and later in Maddox St, where it still continues. He was president of the Publishers' Association in 1928-9.

Arnold, Sir Edwin (1820-1904), poet, b. Gravesend, son of a Sussex magistrate, and educ. King's School, Rochester, King's College, London, and Univ. College, Oxford, where he gained the Newdigate prize for a poem on Belshazzar's feast. He went to India as a schoolmaster, and during the mutiny was able to render signal service to the gov. Later he became a journalist, and was on the staff of the *Daily Telegraph* (of which he was ultimately editor), and it was he who was largely responsible for the dispatch of Stanley to the Congo. He is, however, best remembered as a poet. His most famous poem is *The Light of Asia*, 1879, an epic poem on the life and teachings of Buddha. In *The Light of the World*, 1891, he attempted, less successfully, a similar treatment of the life and teaching of Jesus. Amongst his other works are *The Song of Songs of India*, 1875, *The Song Celestial*, 1885, *With Sa'di in the Garden*, 1888, *Adzuma*, 1893. He was made a C.S.I. in 1877, and K.C.I.E. in 1888.

Arnold, John (1736-99), horologist, b. Bodmin, Cornwall, where he was apprenticed to his father, a watchmaker. He first made his name as the maker of a very small half-quarter repeater for King George III, but later became famous for his chronometers. See also CHRONOMETER and WATCH.

Arnold, Malcolm (1921-), composer, b. Northampton, studied at the Royal College of Music in London and first played trumpet in the London Philharmonic Orchestra. He quickly made his way with a number of witty, high-spirited, and well-designed works, including the overture *Beckus the Dandypat*, a symphony for strings, clarinet and horn concertos, sonatas, etc.

Arnold, Matthew (1822-88), poet and critic, b. Laleham, Middx, on Christmas Eve. His father was the famous headmaster of Rugby School. From here, having obtained a scholarship at Balliol, A. went on to Oxford in 1840. Even at this early time his mind had already turned to literature, and his poem, *Alaric at Rome*, had been recited in Rugby School in 1840. In 1843 he obtained the Newdigate prize with a poem on Cromwell. In the following year he took his degree, and a year later was rewarded with a fellowship at Oriel

College. After leaving the univ. A. for a short time taught classics to the fifth form at his father's old school, but he did not long remain a schoolmaster. In 1847 he became private secretary to Lord Lansdowne, then a leader of the moderate Whigs, and on him A., to a large extent, modelled his politics.

In July 1849 appeared *The Strayed Reveller and other Poems*, by 'A.' The pub. attracted but little attention, so little, in fact, that the ed. was withdrawn very hastily. This collection, although it contained a number of poems of little merit, at the same time contained much that has gained for itself a permanent place in Eng. literature. In 1852 appeared his *Empedocles on Etna and other Poems*, again by 'A.' but this also was quickly withdrawn, to be followed, however, in the next year by a collection of poems, many of which had been already pub., together with an essay which embodied A.'s idea of poetry. A year before the pub. of *Empedocles on Etna*, A. had been appointed by Lord Lansdowne to an inspectorship of schools, and he did an immense amount of good to education in England by the work which he performed as an inspector. His official reports on the various foreign tours of inspection which he undertook were of great utility. He had a great admiration for the Ger. system of education. He himself remarked that the Fr. univ. lacked liberty, the Eng. science, but the Ger. neither. Many of his advocated reforms were carried out both in schools and in univs.

In 1857 A. had been appointed to the chair of poetry at Oxford, and he retained this chair for 10 years, being the first layman to occupy it. Amongst the new poems which were pub. in 1867 we find his greatest poem, *Thyrsis*, a monody on his dead friend, Arthur Clough. He had ceased to be prof. of poetry, but he still occupied a place as a poet second to none, save perhaps Tennyson. By his half-philosophical, half-theological books A. attracted much attention, and he struck the keynote of his philosophy in preaching his favourite doctrine of 'sweetness and light.' His application of literary methods of criticism to the Bible aroused great interest in the country. He argued that much that was wrong in the theology of the time rested solely on the fact that the Bible was read as a scientific work, whereas his own conception of it was that it was literary, and therefore the methods of literary criticism could be applied to it. *Literature and Dogma*, 1873, marks the breaking away entirely of A. from Christian doctrines. His methods of criticism were not always fair, nor always in good taste, but his own criticism roused so much bitter feeling that the methods adopted by both sides contain much that cannot be commended. In 1883 he received a pension of £250 per annum, and in the same year he lectured in the U.S.A. He d. at Liverpool of heart failure, and was buried at Laleham.

His works, in addition to those already mentioned, include *Essays in Criticism*,

1865, *New Poems*, 1867, *Lectures on the Study of Celtic Literature*, 1867, *Culture and Anarchy*, 1869, *Irish Essays*, 1882, and *Discourses on America*, 1885. His collected works (including a bibliography) were pub. in 1903-4, and letters in 1895 and 1901. See lives by A. Birrell, 1892; G. Saintsbury, 1899; F. L. Bickley (*Matthew Arnold and his Poetry*), 1911; Sir A. T. Quiller-Couch, 1918; Sir W. Raleigh, 1923; E. Blunden, 1932; L. Trilling, 1939; E. K. Chambers, 1947; C. Dymont, *Matthew Arnold* (selection, with introduction), 1948.

Arnold, Samuel (1740-1802), Eng. musician. He was employed by the musical directors of Covent Garden, for whom he wrote many musical plays. His first was *The Maid of the Mill*, which was produced in 1765. In 1769 he leased Marylebone Gardens, where he produced many stage works. In 1773 he took the degree of D. Mus. at Oxford Univ. He became organist of the Chapel Royal 10 years later, and was afterwards appointed to the same position in Westminster Abbey. He is best known as the editor of a collection of cathedral music and of the works of Handel.

Arnold, Thomas (1795-1842), headmaster of Rugby, b. W. Cowes. His early education was received at Warminster, but in 1807 he went to Winchester, where he remained until he entered the univ. of Oxford in 1811. He entered at Corpus Christi College, but 4 years later was elected a fellow of Oriel College, where he remained until 1819. His dread of insincerity led him to hesitate deeply before he took orders, but once his doubt of his own realisation of the Christian faith had passed, he became a devout and passionate Christian. After leaving the univ. he settled at Laleham, near Staines; here he took pupils for preparation for the univ., and also devoted himself to study and began to write his *History of Rome*. He was appointed to the headmastership of Rugby School, 1828, and here he proceeded to do what had been prophesied of him, 'that he would change the face of education all through the public schools of England.' Schools were no longer to be mere places where the classics and a certain amount of general knowledge were learnt, but places in which the intellectual and the moral life were harmoniously blended, training places for Christian gentlemen. Though his influence has sometimes been exaggerated, the modern Eng. public school system, with its insistence on character training and its breadth of knowledge, owes more to A. than to any other single individual; and his influence has been passed down to schools outside the public school range. He found time to continue his studies amidst his school work, and he did a great amount of literary work. In 1841 he was appointed regius prof. of modern hist. at Oxford. He pub. many vols. of sermons, an ed. of Thucydides, a *History of Rome to the Second Punic War* in 3 vols., 1838-43, and *Introductory Lectures on Modern History*, 1842. See life by J. J. Findlay, 1917.

Arnold, Thomas (1823-1900), scholar, younger son of Dr A. of Rugby. Educ. there and at Oxford, he was an inspector of schools in Tasmania. In 1856 he became a Rom. Catholic, and was Prof. of Eng. at the Catholic Univ., Dublin, 1856-62. His works include a *Manual of English Literature*, 1862, and many eds. of the Eng. classics.

Arnold, Thomas Kerchever (1800-53), Brit. educationist. Educ. at Cambridge, he was rector of Lyndon, Rutland, 1830-1853. He pub. many text-books, including his well-known *Practical Introduction to Greek Prose Composition*, 1838, and the corresponding work on Lat. prose, 1839.

Arnold, tn and par. of Notts, England, 4 m. N.E. of Nottingham, in Sherwood Forest, with hosiery and brewing industries. Pop. 22,000.

Arnold-Forster, Hugh Oakeley (1835-1909), politician, grandson of Thomas Arnold of Rugby. He was b. at Dawlish and educ. at Rugby and Univ. College, Oxford. He soon became interested in politics, especially those dealing with Irish questions. His political ideas, in the beginning of Liberal tendencies, changed to a sympathy with the Unionist cause. Under Balfour he was offered the position of secretary for war (1903), but resigned when his fellow ministers disagreed with his projected army reforms (1906).

Arnold of Brescia (d. 1155), It. monk and reformer, b. Brescia, and one of the most prominent opponents of the temporal power of the papacy. He was b. c. 1100 of noble parents. Educ. Paris, he may possibly have studied under Abelard. On his return to Italy he became a canon regular, and was noted for his extreme asceticism. Accused by St Bernard of being a follower of Abelard, he shared Abelard's condemnation in 1140. He took refuge at Zürich, where he remained for 3 years. On his return to Rome (1143), A. joined the republican movement, of which, before long, he became the most prominent leader; he made continual attacks upon the clergy, vehemently denying their right to hold property. On the accession to the papacy of Adrian IV (Nicholas Breakspear), however, in 1154, A. was forced to flee into Campagna. Here he was seized and brought to Rome (1155). In Rome he was condemned, hanged, and burnt, and his ashes thrown into the R. Tiber.

Arnold von Winkelried, see WINKELRIED.

Arnoldus de Villa Nova, also called **Arnaud de Villeneuve** (d. c. 1313), probably of Sp. origin, famous as an alchemist, astrologer, and physician. He lived during the 13th and 14th cents., and appears to have studied chem., medicine, and Arabian philosophy. After living at the court at Aragon he is believed to have lived for some time in Paris. He was forced into exile in Sicily owing to the hostility of the Church towards him. On the illness of Clement V he was summoned to attend him at Avignon, but d. on the way. Amongst the writings attributed to him on somewhat small

authority are *Rosarius Philosophorum*, *Novum Lumen*, *Flos Florum*, and the *Breviarum Practicæ*.

Arnolfo di Cambio, or di Lapo (1232-1302), It. architect, *b.* Colle di Val d'Elsa. Designed the following buildings in Florence: the church of S. Croce, c. 1294 onwards; the cathedral, 1296 onwards; and, according to Vasari, the Palazzo Vecchio, 1298-1314.

Arnott, Archibald (1771-1855), physician, *b.* Dumfries. He was surgeon to the 20th Foot Regiment, was posted to St Helena in 1819, and there gained the friendship of Napoleon, whom he attended in his last illness. He signed the post-mortem report on Napoleon. In 1822 he pub. *Account of the Last Illness of Napoleon*.

Arnott, Neil (1788-1874), physician, *b.* Arbroath. After having graduated M.D. at Aberdeen he studied medicine (M.D., 1814), and was appointed surgeon to the E. India Company. He began to practise in London and attained eminence as a physician and physicist, being appointed physician extraordinary to the queen in 1837. Author of *Elements of Physics*, 1828-9, and of sev. hygienic inventions, including the water-bed.

Arnotto, or Arnatta, see ANNOTTO.

Arnould, Sophie (1740-1802), Fr. operatic singer, *b.* Paris; she entered the Opéra in 1757 and was the most prominent singer there till 1778. Among her chief parts were those of Iphigenia in Gluck's *Iphigénie en Aulide*, Eurydice in his *Orphée et Eurydice*, and the prin. roles in Rameau's works. She was famous for her wit and conversational powers, and was the friend of d'Alembert, Helvétius, Diderot, and Rousseau. See collection of her *bons mots* in *Arnouldiana*, 1813, and her life by the brothers Goncourt, 1857.

Arnould-Plessy, Jeanne Sylvanie (1813-1897), Fr. actress, *b.* Metz. She married Auguste Arnould, a Fr. man of letters. She created a large number of roles, but excelled in the part of a coquette.

Arnprior, tn of Renfrew co., Ontario, Canada, on Chats Lake, 38 m. W. of Ottawa. In the neighbourhood are marble quarries and iron mines, and the tn contains large lumber mills. Pop. 4829.

Arnsberg, Ger. tn in the *Land* of N. Rhine-Westphalia (q.v.), in the Ruhr valley (q.v.), 55 m. ENE. of Düsseldorf (q.v.). It was a centre of the Fehmle Courts (q.v.), and was a member of the Hanseatic League (q.v.). There are brewing and paper industries. Pop. 10,000.

Arnstadt, Ger. tn in the dist. of Erfurt, 10 m. S. of Erfurt (q.v.). In its church of St. Boniface, Johann Sebastian Bach (q.v.) was once the organist. It is a railway junction, there are fluorspar and manganese mines in the dist., and there are manufs. of machinery and radio equipment. Pop. 28,000.

Arnsvalde, see CHOSZCZNO.

Arnau, Nicolas (1629-92), Fr. theologian, *b.* Nérancourt. He was appointed prof. of theology and metaphysics at Padua, where he d.

Arnulf 1. A Rom. emperor. He was an

illegitimate son of Carloman, and nephew of Charles the Fat, the indolent and cowardly King of the W. Franks, who d. in the 9th cent. AD. A., having been made ruler of Carinthia by Carloman, then marched against Charles, whose cowardice in buying off his foes had disgusted him; and when Charles was deserted by his ministers, A. became king in his place and, repairing to Rome, was made emperor. Displayed signal bravery in a great fight near Louvain against the Northmen. Later, allied himself with the warlike Magyars in the vain hope of breaking up the domains of the Moravians. D. about AD 899.

2. See ERNULF.

Aroa, copper mining tn in Yaracuy state, N. Venezuela. Pop. 2150.

Aroa, see ARN.

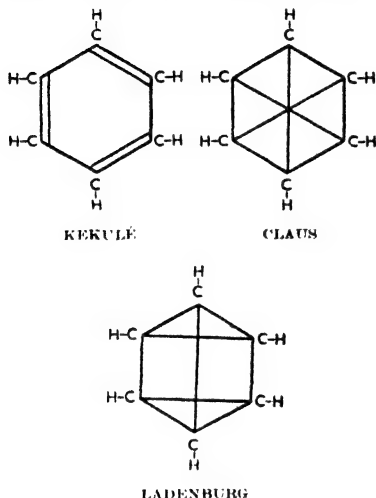
Aroer, name of 2 O.T. places. The first (belonging to the tribe of Gad) was near a trib. of the Jabhok, and opposite Itabba of the Ammonites. Jephthah fought the latter near A. The other A., also in Palestine, was situated near Armo. It was in ant. times the frontier tn of Amorheus, and later of the tribe of Reuben. It belonged to the Moabites in the time of Jeremiah. The ruins of it are now called Arrayr. See Num. xxxii. 34, 1 Sam. xxx. 28, 2 Sam. xxiv. 5, 1 Chron. v. 8, Isa. xvii. 2, Jer. xlviii. 19.

Arolsen, Ger. tn in the *Land* of Hessen (q.v.), 96 m. NNE. of Wiesbaden (q.v.). It was once the cap. of Waldeck (q.v.), and has 2 fine castles. Pop. 3000.

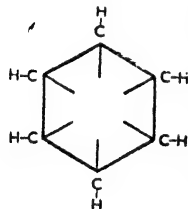
Aromatari, Giuseppe degli (1586-1660), It. physician and naturalist, *b.* Assisi and d. Venice. He studied logic, philosophy, and medicine at Padua, and practised as a physician at Venice for 50 years, although he had offers from the Duke of Mantua, the King of England, and Pope Urban VIII. He had an immense library, which contained many MSS. He wrote *Riposte alle Considerazioni di Alessandro Tassoni sopra le Rime del Petrarca*, Padua, 1611, and also works on medicine and natural hist., including an essay on hydrophobia and a letter on the generation of plants from seeds.

Aromatic Compounds form one of the great divs. of organic compounds. They may be looked upon as derivatives of benzene, and are distinguished from fatty or aliphatic compounds by their molecules containing closed chains. The molecular formula of benzene, for instance, is C_6H_6 , but the molecular formula of another organic compound, dipargyl, is also C_6H_6 . The chemical behaviour of the 2 compounds is, however, markedly different; dipargyl combines easily with bromine, giving additive compounds, and is very unstable; benzene is remarkably stable, and usually gives substitution products, that is, products where certain atoms are displaced by an equivalent number of other atoms or radicals, without the state of combination of the rest of the molecule being altered. Examination of the behaviour of benzene led Kekulé in 1865 to the conclusion that the molecule of benzene is symmetrical, and that each carbon atom is directly united to one, and

only one, atom of hydrogen. As carbon is assumed to be quadrivalent, its combination in a compound must be expressed in a graphic formula by drawing 4 lines from each carbon atom to the other atoms to which it is directly united. This has been done in sev. ways, each of which agrees with many of the phenomena in the chemical behaviour of benzene. The earlier formulae were:



A later formula, suggested by Armstrong and Baeyer, appeared to be more satisfactory. In this formula one valency of each carbon atom appears directed towards the centre, in order to express that by the mutual action of all the 6 valencies the power of each is rendered latent, and this agrees with the facts relating to benzene and its derivatives.



Modern work on valency (q.v.) has thrown new light on the whole problem. Thiele's suggestion that the residual valency of each carbon atom is uniformly distributed round the ring is now accepted in essentials.

A.C.s usually contain a larger percentage of carbon than aliphatic compounds, and have a characteristic reaction with nitric acid, producing nitro-compounds; and also with sulphuric acid, producing sulphonic derivatives. When nitro-compounds are reduced they are converted into amino-compounds, which are converted into diazo-compounds on treatment with nitrous acid in the cold; if the solution is warmed, phenols are obtained.

Aromatic alcohols are prepared by methods analogous to those employed in producing aliphatic alcohols: the corresponding halogen derivatives are heated with water, weak alkalis, or silver hydroxide.

Aromatics, substances characterised by a fragrant, spicy taste and odour, as cinnamon, ginger, eucalyptus, camphor, etc.

Arona, It. tn in Piedmont (q.v.), at the SW. end of Lake Maggiore (q.v.). It has a church with a 10th-cent. tower, and a ruined castle in which St Carlo Borromeo (q.v.) was b. A. has a transit trade with Switzerland, via the Simplon Pass (q.v.), and is a terminus for the boat traffic on the lake. Pop. (tn) 8000; (com.) 10,200.

Aroodje of Oroosh, see BARBAROSSA, HORUK.

Aroostook, name of a riv. which rises to the N. of Maine, and flows into the St John in New Brunswick. In length 140 m., it is known in hist. on account of its connection with the much-discussed and troublesome question of the N.E. boundary between Brit. America and the U.S.A.

Arosa, Swiss holiday resort, 19 m. S.E. of Chur (Grisons), situated amidst pine woods, at an altitude of nearly 6000 ft.

Arouet, Jean François, see VOLTAIRE.

Arpad (c. 870-907), hero of Hungarian ballad and romance, and founder of the kingdom of Hungary. He founded the A. dynasty, which lasted till 1301.

Arpeggio, chord in music of which the notes are played in very rapid succession, instead of simultaneously.

Arpino (anc. Arpinum), It. tn in Lazio (q.v.), standing on a hill 12 m. E. of Frosinone (q.v.). Originally a tn of the Volsci (q.v.), it later fell to the Samnites (see SAMNIUM), and eventually came under Rom. dominance. There are pre-Rom. remains. Cicero (q.v.) was b. here, and Marius (q.v.) was b. at Casamare (anc. Cereatae) near by. Paper and textiles are manuf., and there is a trade in agric. produce. Pop. (tn) 2800; (com.) 11,300.

Arpinum, see ARPINO.

Arquà Petrarca, It. vil. in Veneto (q.v.), 12 m. SW. of Padua. It is in the Euganean Hills (q.v.) and is famous for its associations with Petrarch (q.v.), whose house and tomb are preserved here. Pop. 2000.

Arquata del Tronto, It. tn, in the Marche (q.v.), on the Tronto, 17 m. SW. of Ascoli Piceno (q.v.). Pop. (com.) 5500.

Arquebus, or **Harquebus**, hand-gun, forerunner of the modern rifle, dating from the 15th cent. Those of the earliest construction were fired by a 'match' from the touch-hole. They were first fired from a forked rest at the height of the chest, but the Germans invented a hooked form of butt, and elevated the barrel. See also FIREARMS.

Arracacia, genus of S. Amer. plants of the family Umbelliferae. The tuberous roots of *A. xanthorrhiza* (arracach) and *A. esculenta* are edible.

Arracan, see ARAKAN.

Arrack, spirituous liquor manuf. in the E. Indies from a large variety of

substances, fermented rice or coco-nut juice, etc. Pure, clear, and transparent, and of the colour of straw, when properly made it has a peculiar but agreeable taste. It contains 52-4 per cent of alcohol.

Arragon, see ARAGÓN.

Arrah, tn in the Shahabad dist. of W. Bengal, India, 320 m. N.W. of Calcutta. In 1857 a dozen Englishmen, with 50 Sikhs, defended an ordinary house against 2000 sepoys and a large mob, till finally relieved by Maj. Eyre.

Arraignment, Eng. legal term signifying the calling of the prisoner to the bar of the court to plead 'guilty' or 'not guilty' to the indictment against him. It corresponds to the Scottish legal term 'calling the diet.'

Arrajan, see BEHBEHAN.

Arran, James Hamilton, 2nd Earl of (c. 1515-75), nobleman, regent of Scotland during the minority of Mary Stuart. He was created Duke of Châtelherault by Henry II of France. In 1554 he resigned his position as regent to the queen-mother, Mary of Guise, and went into exile in France. He returned to Scotland to take part in the intrigues against Elizabeth. In 1573 he acknowledged James VI's authority.

Arran, James Stuart, Earl of (d. 1596), statesman. He overthrew Morton, who had been regent of Scotland since 1566, and with the Duke of Lennox managed the affairs of Scotland until 1585, when he was deprived of his authority.

Arran, is. of Bute co., Scotland, the largest is. in the frith of Clyde, lying between the Mull of Kintyre and Ayrshire. It is about 20 m. long, and 11 m. broad at its widest part. Its area is 105,814 ac. In winter a daily steamer maintains communication with Brodieck and Lamlash, whilst in the summer the number of steamers which call is much greater. The general aspect of A. is mountainous, the N. peaks being very imposing. An ancient sea margin encircles the coast with a low platform; the country rises abruptly to the high peaks on the S. and SW. The geology of A. is of peculiar interest, for within its comparatively confined limits distinct sections of the great geological formations can be observed; the botany, also, of the dist. repays study by the variety and rarity of many of its plants. Relics of ancient times exist in the shape of Dan. forts, cairns, standing stones, etc. A few red deer may still be found in the wilder hilly dist., and blackcock and grouse abound; the game of the is. is, however, strictly preserved. Lamlash, which possesses a very fine natural harbour, and Brodieck are the chief vils. The is. is a favourite resort of summer visitors. Pop. 2500.

Arrangement, or Transcription, of music is the adaptation of a piece of music to an instrument or instruments other than those for which it was originally composed, as when orchestral compositions are arranged for the pianoforte. The pianoforte A.s of Liszt are acknowledged to be unexcelled, but they are equalled by those of Busoni.

Arras, Fr. tn, cap. of the dept of Pas-de-Calais, on the R. Scarpe. It was the ancient cap. of the Celtic Atrebates, and subsequently of the prov. of Artois (q.v.). It was famous for its tapestry, hence the Eng. word 'arras.' The old tn stands on an eminence, with the new tn below it. It is the seat of a bishopric. The 18th-cent. cathedral and the beautiful 16th-cent. tn hall were very seriously damaged during the First World War, but have been reconstructed. A. was the bp. of Robespierre. Prin. manufs. are agric. implements, hosiery, lace, and beet-sugar, and there is a large trade in cereals and vegetable oil. Pop. 33,300.

Arras, Battle of, the first of the big battles of the third year of the First World War. The previous year (1916) had closed on the doubtful note of the battle of the Ancre (q.v.), which had at least pressed the Germans back to the Hindenburg line. This famous line they reached by April of 1917. As a position it left almost nothing to be desired in point of natural and artificial defences, besides giving to the enemy the advantage of a much shorter front than on the Somme and Ancre. Its flaw was the uncertainty of its axes—the positions round A. to the N. and those of Laon to the S. In the hope of pushing home such advantages as had been gained in 1916, the Allies were now preparing a general offensive on both these axes. The French were to attack on the Laon front and the British on that of A. The Brit. general advance began on Easter Monday, 9 April, after the usual preliminary bombardment, on a front of about 48 m., the objectives being, in the N., Lens and its surrounding cluster of coal vils., and in the S. Quent, the nearer end of the hard-contested and powerfully fortified Brocourt 'switch' line. Had the Brit. offensive succeeded in taking these 2 points, the road to Cambrai would have been open. All went well in the opening stages, and by 11 April the famous Vimy Ridge, together with 3000 yds of the formidable Hindenburg line, was taken, in addition to over 10,000 prisoners and 160 guns. All arms co-operated smoothly, the work of the tanks being a great advance on their performances of 1916. But though Lens was hemmed in, Quent, at the other end, was not shaken. It now remained for the French to deliver their blow, and the result was the disastrous battle of the Aisne heights begun on 16 April. (*See under AISNE, BATTLE OF THE.*) The idea of the 'decisive blow,' which was to be struck simultaneously at A. and Laon, had failed. In Mar. 1918 the Germans made a desperate attempt to capture A., but the Brit. line held firm and so saved not only that city but also Amiens (q.v.). In the Second World War Brit. troops entered A. on 1 Sept. 1944.

Arrastre, Mexican and Amer. mule-mill for grinding ore.

Array, Commissions of, see COMMISSION, MILITARY.

Arreau, see AURE.

Arreboe, Anders Kristensen (1587-1637), Dan. poet. After having studied

at Copenhagen Univ., he took holy orders, and became Bishop of Trondheim in 1618. His conduct of life being, however, such as to disgrace his office, he was deposed therefrom. His chief work was the religious poem *Hexameron, or Six Days of the Creation*, and his trans. from the psalms.

Arrest is the restraint of a man's person, in order that he may be compelled to obey the law, or be brought to trial. It is defined to be the execution of the command of some officer of justice or some court of record. A.s in England can take place in either civil or criminal cases. In civil cases, however, it is only in somewhat exceptional instances that A. takes place. The chief, and practically the sole, cause of such A. is 'contempt of court'; all the superior courts have power to arrest persons for this reason. This is done by the issue of a writ, by an order of the court or of a judge to the sheriff. Imprisonment for debt was ended by the Debtors Act of 1869, and consequently the writ 'capias ad satisfaciendum' is now rarely issued. It is only made use of in such cases as are excepted from the above Act; such are, when non-payment involves contempt of a competent court, or when a trustee refuses to comply with the order of a court of equity. A debtor may also be arrested to prevent him from absconding or removing his property out of the jurisdiction. A. 'in mesne process,' that is, during the progress of a suit, is now abolished, with the above exceptions. The following are exempt from A. on civil process: ambas, or diplomatic representatives of foreign courts, peers of the realm, Members of Parliament, clergymen during divine service, or on their way to or from service, and all persons attending a court of justice in any capacity, such as witnesses, solicitors, counsel. No person is, however, exempt from A. for contempt of court.

All persons without exception are liable to A. in criminal cases, and outer doors may be broken open for such a purpose. The A. may be either with or without a warrant. A warrant is an order addressed to a peace-officer by a judge or magistrate. If the person named thereon is not in the jurisdiction of the issuing authority, the warrant must be 'backed' by a magistrate of the place where he actually is. A private person is entitled to A. anyone who commits a felony, or inflicts a dangerous wound on anyone, in his presence, anyone whom he has good cause to suspect of felony, or anyone whom he discovers committing certain offences specially provided for by statute. The remedy for wrongful A. is an action for false imprisonment.

Arrest of Judgment, see JUDGMENT.

Arrestment, Scottish legal term, is the process by which a creditor detains the goods or effects of the debtor in the hands of a third party till he is paid. It is divided into 2 kinds: (1) A. in security is used when a claim has not yet become enforceable, as at the commencement of the legal proceedings; (2) A. in execution is used following on a decree of the

court, or on a registered document. A. merely retains the effects; the process of 'furthercoming' is necessary to realise on them. Such funds as are necessary for the sustaining of life are not liable to arrestment.

Arretium, or **Aretium**, modern **Arezzo** (q.v.), one of the most important of the 12 cities of Etruria, especially famous for its red pottery. Interesting architectural excavations have been made; here also was discovered the celebrated bronze chimaera now at Florence.

Arrhenius, Johan (1811-99), Swedish botanist and agriculturist, b. Klöfdala, Sweden. He was a member of the scientific societies of Upsala and Stockholm; sev. plants have been named after him.

Arrhenius, Svante (1859-1927), Swedish scientist, b. Upsala; studied and began to teach at Upsala Univ.; became a prof. of physics at Stockholm in 1891. He was awarded the Davy medal in 1902, the Nobel prize for chem. in 1903, and became a member of the Chemical Society in 1898. His theory of electrolytic dissociation is a valuable contribution to science. He investigated the influence of light pressure on minute particles and showed how it affected the tails of comets. His *Text-book of Electro-Chemistry* has been trans. from the German by McCrae. He pub. *Destinies of the Stars* (Eng. trans. by Fries) in 1918, and the year before he d. he issued a revision of 2 of his earlier astronomical works.

Arrhidaeus, or **Aridaeus** (d. 317 bc), son of Philip II of Macedonia and a courtesan, was half-brother to Alexander the Great, and on his death in 323 bc was named his successor. He married Eurydice, granddaughter of Philip's elder brother, Perdicas, and, being an imbecile, became the tool of his father-in-law, his wife, then of Antipater and Polysperchon. He and Eurydice were put to death by Olympas, mother of Alexander.

Arrhythmia, medical term applied to irregularity of the action of the heart, manifesting itself in a lack of rhythm in the beat of the pulses, etc.

Arria, wife of Caecina Paetus, who, when her husband was implicated (AD 42) in the plot of Scribonianus against Claudius and condemned to death, resolved not to survive him. After stabbing herself, she handed the dagger to her husband with the words: 'It does not hurt, Paetus.' Her daughter A. was married to Thrasea Paetus, and when the latter was condemned to death by Nero (AD 66) she would have imitated her mother's example, but was dissuaded by Paetus for the sake of their children. She was banished.

Arriaca, see GUADALAJARA.

Arriaga, Manoel José de (1839-1917), Portuguese president and lawyer, b. Horta, Azores, of a distinguished family which was descended from Don Alfonso III of Castile. He became the first president of the Portuguese rep. A. studied law at Coimbra Univ., and while there was disinherited by his father for his republican sympathies. Elected

deputy for Funchal as a republican in the parliament of 1882-4 and for Lisbon, 1890-2. Elected president 1911, defeating Bernardino Machado. Wrote essays on jurisprudence and political economy.

Arrianus, Flavius (c. AD 95-c. 175), Gk historian and philosopher, b. Nicomedia in Bithynia. In youth he was the friend and pupil of Epictetus (q.v.). Hadrian appointed him Governor of Cappadocia, in which capacity he served from 131 to 137 and distinguished himself in a campaign against the Alani. He also spent much of his time at Athens, where he was Archon in 147-8. The latter years of his life were

legislative assembly, and in 1852 was made senator.

Arria, in architecture, the sharp edge produced by the intersection of 2 plane or curved surfaces.

Arroba, see METROLOGY.

Arrol, Sir William (1839-1913), head of the firm of Wm A. & Co., engineers, who constructed the Tay and Forth Bridges and the Manchester Ship Canal under his direction. Represented S. Ayrshire in Parliament, 1895-1906.

Arromanches, Harbour of, artificial prefabricated harbour used in the early days of the Anglo-Amer. invasion of



C.O.I.: Crown Copyright

PIER AND PIERHEAD AT ARROMANCHES

The first traffic moving off a completed pier, 18 June 1944.

spent at Nicomedia, where he devoted himself to writing the following works: *Moral Discourses* and *Enchiridion* of Epictetus (ed. from verbatim notes); *Anabasis of Alexander*; *Indica*; *Campaign against the Alani* (a fragment); *Periplus of the Euxine*; *Cynegeticus*; and the *Tactica*, sometimes attributed to Aelian. See A. G. Roos, *Flavii Arriani quae exstant omnia* (2 vols.), 1907-28. There is also a text with trans. by E. I. Robson (Loeb Library, 2 vols.), 1921-33.

Arrière Ban, feudal summons to freemen to follow their sovereign to the field with vassals, provender, etc.

Arrighi, Lodovico degli, see VICENTINO.

Arrighi, Toussaint, Duke of Padua (1778-1853), Corsican general, b. Corte, in Corsica, and d. Paris. He distinguished himself in the Egyptian campaign, and in 1809 was made general and Duke of Padua. He also took a leading part in the battle of Leipzig, 1813, and in the campaign of France, 1814. In 1849 he was appointed deputy for Corsica at the

Normandy in 1944. Without this harbour it would have been necessary to storm Cherbourg or Le Havre, but great difficulties would have been experienced in attempting to reoccupy those ports, for the Germans, even had they been expelled, would have wrecked the port installations, and the subsequent development of the battle of Normandy might have been very different (see WESTERN FRONT IN SECOND WORLD WAR). The specialised civil engineering knowledge and experience essential to such an undertaking were first acquired in 1941-2 in constructing military ports in Scotland to supplement Brit. civil ports and in planning port extensions in the Middle E. to offset the closing of the Mediterranean. At this time, too, special landing craft were developed, and amphibious trucks for unloading stores. But in 1942 the Directorate of Ports and Inland Water Transport, which supervised these developments, was asked to produce piers a mile long to extend from shore

to water deep enough for coasters to lie alongside; at the same time the piers would have to be strong enough to take the heaviest weapons and capable of being put together in a few days and of riding out summer storms. This meant an entirely new design for the spans and the pontoons of standard Royal Engineers' floating bridging equipment. The prototype was constructed on a Scottish beach early in 1943, and tests showed that 6 spans mounted on floats or about 500 ft of the floating bridge could be towed in the open sea in any weather up to a given wind force, and that the unit would be complete in itself and ready for joining up. Sev. pierhead pontoons could be assembled together in various ways according to the purpose in view—in line to form a wharf, in extension of the pier to form a jetty, or by combining both forms. Mooring the floating bridge was effected by the 'kite' anchor with a great holding power, and so designed as to allow each pontoon to be moored fore and aft in 6 min. The arrangement of the connection of the bridge girders with the pontoon saddles gave sufficient play for lateral and vertical movement between the spans of the pontoon. Many types of breakwater were considered in the effort to find one that would not break itself or its moorings, but, for really rough weather, the only immediate alternative was lines of blockships. These, however, were only effective in up to 1 fathom of water, and the pierheads had to have 3 fathoms. Hence it was necessary to have some kind of caisson for the bulk of the breakwaters. Six miles of breakwater were required, and dry-dock facilities round the Brit. coast were much strained by the labour of constructing the caissons, which were all about 200 ft long and in 6 heights varying from 60 ft down to 25 ft, with dead weights from 7000 tons to 1700 tons each; but the large size constituted the greater part of the breakwater. To increase structural strength the units had cross walls and a central longitudinal watertight bulkhead, thus forming cells on each side of the bulkhead. Flooding valves of varying sizes were allocated to the watertight compartments, and when all the valves were open the sinking times at A. varied from 5 min. to 20 min. according to the depth of the water and other factors.

Dispatch of the equipment across the Channel began on the evening of D-Day (6 June 1944), and by 10 June the harbour construction at A. was proceeding well. But 12 days after D-Day a storm of unprecedented force for June sprang up and held for sev. days. On the side W. of A., where the Americans were establishing their harbour, great damage was done. But at A. the damage was not nearly so vital, and after the storm it was soon brought up to full efficiency as a port. A. functioned as a harbour in every sense of the word, and its name will be remembered in the hist. both of civil engineering and of the world's ports. See Sir Bruce G. White, 'The Harbour of Arromanches,' in the *Overseas Engineer*, Oct. 1945, and Sir F. Morgan, *Overture to Overlord*, 1950.

Arrondissement, name of the largest sub-div. of the Fr. dept. It is composed of cantons, which are divided into coms. Each A. has a sub-prefect and council to manage its affairs.

Arroo, or **Arru**, see **ARU**.

Arrow, see **ARCHERY**.

Arrowgrass, or *Triglochin palustris* and *T. maritimum*, is a plant of the family Juncaginaceae, occurring in Britain. The former species is common in marshes and pools, while the latter grows in salt-water marshes.

Arrowhead, or *Sagittaria sagittifolia*, is a species of the family Alismataceae and genus *Sagittaria*; it is a native of Europe. It is a water-plant, only the arrow-shaped leaves and the flowers appearing above the surface. There are also leaves below the water, and these are very thin and ribbon-like; the root is a rhizome.

Arrowrock Dam, dam 350 ft high, 1150 ft long, on the Boise R., Idaho, U.S.A. It was constructed by the Bureau of Reclamation, a body estab. by Act of Congress, 1902. It forms Arrowrock Reservoir (capacity 286,500 ac.-ft), used to irrigate c. 170,000 ac.

Arrowroot, farinaceous substance prepared from the roots or tubers of various plants: *Maranta arundinacea*, *Curcuma angustifolia*, and *Tacca leontopetaloides*, the E. Indian A.; *Arum maculatum*, the Portland A. Ground down, strained carefully, and dried in the sun, the preparation forms a valuable and easily digested food; it is often adulterated with potato starch. The S. Amer. Indians used to apply the roots of a plant confounded with *Maranta* as an antidote to the effect of poisoned arrows—hence the name.

Arrowsmith, Aaron (1750–1823), distinguished cartographer, b. Winston, co. Durham. He came up to London, and by 1790 had founded a great map-making business, raising the execution of maps to a pitch of excellence never before attained.

Arrowsmith, Edmund (1585–1628), b. Haydock, near St. Helena, and educ. Douai. Ordained priest in 1612, he pursued his missionary labours in his native co. from 1613 to 1628, being received into the Society of Jesus in 1623. Twice apprehended for his faith, he was found guilty of treason in 1628 and accordingly sentenced to be hanged, drawn, and quartered.

Arrowsmith, John (1790–1873), nephew of the elder Aaron A., to whose business he succeeded. His first pub., in 1834, was the well-known *London Atlas*. Helped to found the Royal Geographical Society in 1830. He received a gold medal in 1863 for his services to geographical science.

Arroyo Molinos, Sp. vil. in the prov. of Cáceres, the scene of a victory of Viscount Hill (q.v.) over the French in 1811 during the Peninsular War (q.v.).

Ars Poetica, or the *Epistle to the Pisos*, is one of the finest of the poems of Horace. The date of it is uncertain, though it appeared before the poet's death in 8 bc. The title of the *Art of Poetry* for the *Epistle to the Pisos* is as old as Quintilian, but it is now agreed that it was not intended for a complete theory of the poetic

art. It is conjectured with great probability that it was intended to dissuade one of the younger Pisos from devoting himself to poetry, for which he had little genius, or at least to suggest the difficulties of attaining to perfection.

The poem is a discussion of dramatic poetry, largely based on Gk text-books, but full of Horace's own experience and of his own good sense. Young aspirants to poetical fame regularly began with tragedies, and Horace, accepting this as an actual fact, discusses the rules of tragedy with as much gravity as if he were dealing with some really living and national form of poetry. This discursive and fragmentary poem was taken in later ages as an authoritative treatise; and the views expressed by Horace on a form of poetical art with which he had little acquaintance had, at the revival of literature, and even down to the last cent., an immense influence over the structure and development of the drama. Just as modern comedy based itself on imitation of Plautus and Terence, and as the earliest attempts at tragedy followed in the steps of Seneca, so in the theory of both Horace, and not the Greeks, was the leading influence. See HORACE.

Arsaces, Persian name occurring on Persian seal. A. I was the founder of the Parthian dynasty, and of the dynasty of the Arsacides which fl. in the 3rd cent. BC. About 250 he raised the standard of revolt against the rule of the Seleucidae, and, having succeeded in emancipating his countrymen, was elected king. Reigned for 2 years. All Parthian kings officially bore the name A.

Arsacidae, dynasty of Parthian kings from its founder Arsaces (q.v.), who wrested a kingdom for himself from Seleucid Antiochus II about 250 BC. The greatest kings were Mithridates and Tiridates. The Arsacidean empire was overthrown in AD 226 by Ardashir, founder of the Sassanid empire.

Arsamas, see ARZAMAS.

Arsenal. The name appears in Romanic languages under various forms, and is of Arabic origin; It. *arsenale*, Sp. *arsenal*, Arabic *dar aḥḥind'ah*, meaning a house of trade or manuf. The word has been adopted to imply (1) a public estab. where arms and equipment are manuf.; and (2) a repository or magazine of arms and military stores of all kinds, both for land and sea service. An A. of the premier or first class includes gun and carriage factories, laboratory, ammunition and small-arms factories, powder factory, and specious storehouses. In an A. of the second class the factories are replaced by workshops. As an A. is a source of supply during war, great care is taken to erect it in a suitable position. A.s of the first class should be situated at the base of operations, secure from attack, at a safe distance from the frontier.

The prin. A.s in Great Britain are the Royal A., Woolwich, and Chatham, Sheerness, Portsmouth, and Plymouth A.s. Gov. foundries are at Woolwich and small-arms factories at Enfield. Malta and Gibraltar are the chief overseas A.s.

The sub-divs. of branches in a large A. are: (1) storekeeping; (2) construction; (3) administration. Under (1) are the armoury, the ordnance dept, and the magazines. Under (2) come ammunition, laboratories, and firearms of all descriptions, and under (3) clerical work and its officials.

The chief continental naval A.s are: *France*, (Cherbourg, Brest, Toulon, Bordeaux); *Germany* (before 1939), Kiel, and the inland factory at Esson; *Russia*, Kronstadt, Leningrad, Sebastopol; *Italy* (before 1939), Naples, Spezia, Genoa, Venice; *Spain*, Cartagena, Cadiz, Barcelona; *Portugal*, Lisbon. For Amer. A.s see UNITED STATES, *Arsenals*.

Arsenic, chemical element (symbol As, atomic number 33, atomic weight 74.91) which is generally looked upon as a semi-metal, connecting, with antimony and bismuth, the great div. of non-metals with that of metals. The term is often applied to the white oxide of A. (As_2O_3) which is the most important compound commercially.

The element occurs in very small quantity in nature; it is more usually found as the trioxide in arsenolite, as the sulphide in orpiment and realgar, or as a compound with iron, cobalt, etc., as in arsenical iron and mispickel or arsenical pyrites, $FeSAs$. The metallic A. of commerce is chiefly prepared by strongly heating mispickel in earthenware retorts from which the air is excluded, when most of the A. sublimes, together with a little sulphur. The crude metal is sometimes used as a poison for flies, and as a constituent of lead shot, a small quantity of A. hardening the lead and facilitating the formation of the spherical globules. The pure metal may be obtained from the white oxide by heating it with carbon in the absence of air, which may be effected by covering the oxide in a narrow test-tube with dry powdered charcoal, and nearly covering the mouth of the tube with the finger when heating. The A. sublimes on the cool part of the tube as a dark grey powder.

A. has a sp. gr. of about 5.7 and a specific heat of .083. It crystallises in rhombohedra, and rapidly vaporises at temps. above $100^\circ C$. The density of the vapour is 150 ($H = 1$), so that the gaseous molecule of the element must be looked upon as including 4 atoms.

The chief compounds of A. are the hydride, AsH_3 , the arsenious oxide, As_2O_3 , A. oxide, As_2O_5 , the disulphide, As_2S_3 , the trisulphide, As_2S_5 , the trichloride, tribromide, tri-iodide, and trifluoride ($AsCl_3$, $AsBr_3$, etc.). Arsenious oxide is formed when arsenical ores are roasted in air; it is sublimated as a white powder. A. oxide is produced when the lower oxide is heated with nitric acid. The 2 oxides are the anhydrides of the 2 acids, arsenious acid and A. acid, which may be distinguished by the colours of their silver salts; the addition of ammonia-silver nitrate producing a canary-yellow precipitate of the arsenious salt or arsenite, and a brick-red precipitate of the A. salt or arsenate.

As the A. compounds are extremely poisonous, it is of great importance that efficient tests of their presence should be known. Organic matter should first be expelled by digesting with hydrochloric acid and potassium chlorate, chlorine being driven off by boiling. The A. is then precipitated as a sulphite, which is dried, mixed with potassium cyanide, and heated. The A. is then deposited as a black sublimate, which is converted into arsenious oxide if heated in air. The oxide may be recognised by the production of a yellow precipitate with ammoniacal silver nitrate solution, or by a precipitate of Scheele's green with ammoniacal copper sulphate. Reinsch's test consists of boiling a strip of copper foil in the given solution with the addition of hydrochloric acid; if A. is present it is deposited on the copper and may be recognised as in the previous test. Marsh's test depends on the production of the hydride AsH_3 . An apparatus for the preparation of hydrogen is fitted with a narrow jet, at which the hydrogen is lighted. If a piece of porcelain be held in the flame no stain is produced if the materials used for the production of hydrogen are free from A. The solution to be tested is poured into the hydrogen-generating apparatus; if A. is present the flame assumes a lavender tint and a black stain is produced on the porcelain. The Gutzet test also depends on the formation of AsH_3 , which may be detected by silver nitrate paper (a black precipitate of metallic silver being formed) or by mercuric chloride or bromide paper (a yellow stain being formed).

In medicine arsenious oxide is used as an alterative and tonic in doses of from 1-60th to 1-15th gr. The most frequently used preparation is that known as Fowler's solution, which comprises arsenious oxide and potassium carbonate, together with a small quantity of compound tincture of lavender. This is administered in doses of 2 minims, greatly diluted, and gradually increased to 8 minims. In small doses it acts as a stomachic and is valuable in gastric neuralgia and in the vomiting of chronic alcoholism. In larger doses it acts as a nerve tonic, entering the blood by absorption. Used externally it is a powerful caustic, and its use has been advocated in cancer, lupus, and epithelioma. Large doses of A. preparations produce a burning sensation in the throat, stomach, and abdomen, followed by vomiting, diarrhoea, cramps, exhaustion, and collapse. Symptoms of arsenical poisoning are frequently observed in those working with arsenical pigments, or in those living in rooms where arsenical pigments have been used in the preparation of the wall-paper. In recent years widespread poisoning has been caused by the presence of A. in a supply of invert sugar used in the brewing of beer. By commencing with small doses and gradually increasing the quantity, a certain degree of tolerance is acquired, as in the case of the A. eaters of Styria, who have been known to swallow more than

6 times the minimum fatal dose with no untoward results.

The stomach pump or emetics are to be used in the treatment of arsenical poisoning. Large doses of castor oil are essential to clear out the intestinal tract to prevent reabsorption. A good antidote is provided by freshly prepared peroxide of iron, produced by adding soda or ammonia to the tincture of iron.

Arsenical Pyrites, see MISPICKEL.

Arsenius, St (354-450), probably of Rom. extraction. Renowned for his knowledge of Gk and Rom. literature. Theodosius the Great appointed him as tutor to the princes Arcadius and Honorius. Afterwards lived a secluded life in an Egyptian monastery at Scete, and *d.* at Memphis. His feast is kept by the Rom. Catholic Church on 19 July, and by the Orthodox on 8 May.

Arsenius Autorianus (*d.* 1273), patriarch of Constantinople. Educ. at a monastery in Nicaea, of which he became abbot. Retired as a solitary to a Bithynian monastery. Became patriarch of Nicaea *ad* 1255. Excommunicated Emperor Michael for blinding John, his ward, the rightful heir to the throne, and was banished to Proconnesus, where he *d.* 1273. The new patriarch, Josephus, absolved the emperor, and the quarrel between the Josephists and Arsenites caused the Arsenian schism, which lasted until 1315.

Arsië, It. tn in Veneto (q.v.), 22 m. SW. of Belluno (q.v.). Pop. 2000.

Arsinoë: 1. Daughter of Lysimachus, King of Thrace, and first wife of Ptolemy II Philadelphus (285-247 BC). Banished to Coptos for conspiring against her husband. Her son afterwards became king under the title of Euergetes.

2. (316-269 BC) Daughter of Ptolemy I and Berenice I; married Lysimachus, King of Thrace. Murdered her stepson, Agathocles, in order to secure the succession. Ptolemy Keraunos then murdered Lysimachus and married A., but murdered her son by Lysimachus. She then fled to Samothrace, and afterwards married her brother Ptolemy II, ousting (1), and assuming the name of Philadelphus, 'loving her brother.' He had her deified, and built the temple of Arsinoë-Aphrodite at Alexandria.

3. Sister and wife of Ptolemy IV, with whom she defeated Antiochus at Raphia (217 BC), and mother of Ptolemy V. She was murdered in 203 BC.

4. (*d.* 41 BC) Youngest daughter of Ptolemy XI and sister of the famous Cleopatra. During Caesar's attack on Alexandria the inhab. recognised her as their queen. After Caesar's victory she was allowed to return to Alexandria. She was put to death at Miletus after the battle of Philippi by order of Mark Antony and at her sister's request.

Arsinoë, name given to various tns and vils. founded in Ptolemaic times, and mostly named after Arsinoë II Philadelphus, the wife of Ptolemy II. They include two vils. in the Fayum and a military station near the S. end of the Red Sea. The Fayum was called Arsinoïtes after the same queen.

Arsinoitherium, enormous fossil ungulate mammal discovered by Beadnell in the lower Oligocene of Egypt. It resembled a rhinoceros in appearance and was herbivorous. Its brain was small, and the head massive, bearing two huge pairs of horns.

Arsis and Thesis (Gk 'lifting and setting down'). *Arsis* is that part of a poetical foot on which the stress of the voice falls, the rest of the foot being called the *Thesis*. According to original Gk usage, *Arsis* denoted the raising of the hand or foot in dancing, thus denoting the accented part of the metrical foot, and *Thesis* denoted the fall of the foot, and thus the unaccented part of the prosodial foot.

Arsmetrik, old term for arithmetic in Chaucer's English.

Arson (Lat. *ardere*, to burn), malicious burning of a dwelling-house or outhouse of another. Under Rom. civil law it was punishable by death. In ancient laws of England it was known under the term *boeruel*. Under the Saxons it was punishable by death, and still remained a capital crime on the consolidation of the laws in 1827 and 1837. The Eng. law concerning A. was repealed and replaced by the Malicious Damage Act in 1861. By this Act A. was punishable by imprisonment for life or minor degrees of punishment. By the common law of A. it is required that some part of the house or other building be actually burnt. An attempt or intention does not constitute the offence, but the burning of any part, however trifling, is sufficient to complete the offence. If any person be in the house at the time of burning it is a capital offence.

Under the Malicious Damage Act of 1861 persons setting fire to any place of divine worship, dwelling-house, farmhouse, factory, outhouse, or public building, or setting fire to any place with intent to defraud any person, are liable to be sentenced to imprisonment for life or for any term not less than 3 years. Setting fire to crops is punishable by imprisonment for not more than 14 years.

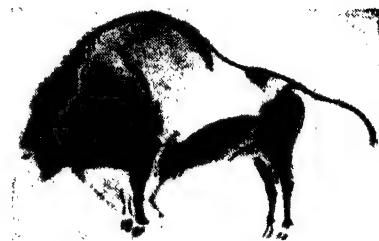
In Scotland A. is known under the term wilful fire-raising.

Art. The term *art*, in the most general sense, may be defined as the skilled exercise of human faculties. It would be justifiable to say that there is an A. in many different things that human beings do, or can do: e.g. one can speak of the 'A. of household management' or even the 'A. of war' as well as the 'A. of painting,' etc. Thus, under the heading *art*, the anc. Chinese included ritual, music, archery, charioteering, and calligraphy.

The 'doing of a thing' is essential to this definition, distinguishing A. from the pursuit of knowledge, as in science and philosophy, the 'knowing of a thing.' This rightly suggests that *art* is closely connected with *craft*, though they are not identical. There is indeed a second definition, 'all that which is not done by man in the way of utility,' in other words all that he does in the way of luxury, pleasure, or from a spiritual need. Prosperous periods, it has been pointed out,

have always been favourable to the production of great A., though the urge may exist even in adverse conditions.

If we go back to the first glimmerings of A. for a clue to the impulses that generated it, there is evidence to show that it was always thought serviceable to man. The cave paintings of the European Stone Age, possibly dating back to c. 30,000 bc (see articles on PRE-HISTORY; DORDOGNE; LASCAUX), were not produced merely to ornament a cave wall, but show a rudimentary connection between A. and religion. They were a form of magic, assumed to give a hunting folk power over their quarry. The artists frequently depicted the animals that provide food as transfixed by arrows. They had so little regard for aesthetic effect that the images



E.N.A.

SPANISH MURAL PAINTING OF THE
MAGDALENIAN PERIOD

of bison and deer are superimposed, one over another. The paintings in any case must have been executed by artificial light, and it is hard to suppose that such toil for meagre spectacular result would have been undertaken with mere decorative intent. It has further been computed that the various phases of A. devoted to *teaching* occupy periods amounting to 10 times as many cents, as do those concerned with *pleasing*. The figures in Egyptian and Assyrian processions are mere symbols a part of ceremonial or contemporary hist. The beginnings of Christian A. show again the use of symbolic figures for the same didactic purpose. Luxury and diversion were clearly not the impulse of these manifestations, and yet it is impossible to deny that aesthetic ideas were in the minds of their authors. Granting that these pictured forms did teach, they must have done so by impressing the spectator.

The principles of aesthetics have become so much an essential part of all considerations of A. matters that it is *feeling* more often than *doing* which is implied now by the word *art*. 'So-and-so may be a clever painter, but he is no artist' is a remark one often hears. It derogates the particular painter's work to an early definition of A. when the A.s were the trades, the tradesmen being artisans. But feeling alone no more fills the definition of A. than does manual skill alone. A. is only completely expressed when material is

re-formed, re-created, re-fused by what R. L. Stevenson called 'the ardour of the blood' and what is known as the *divine afflatus*. The actual re-formation of the stone, metal, or pigment may fall short of the workman's ideal; but if it have realisation enough to frame and hand on the author's message, to show eloquently and appealingly that for which the mind and the heart of the author could find no other utterance, then that work is a work of A.

This 'message,' 'voice,' 'mood' of the work of A. was held by the classic mind to characterise everything under the aegis of the muses (of which *music* was once the adjective or generic term). Thus music, poetry, and the drama depend also upon A. for their perfection. The Greeks, in fact, despite their eminence in sculpture, included no representative of the visual A.s among their 'muses nine.' The industrial A.s may be more or less amenable to an exercise of taste making for luxury and diversion. Hence it is that whilst a farrier is not expected to make horse-shoes except in the approved way, the blacksmith working at the same forge may make a gate that one day might find its way into a museum of objects of A. Farriery therefore is not an A., but smithing perchance may be.

To avoid confusion between all such industries possibly amenable to the artistic sense on the one hand, and the higher activities on the other, wherein material is worked, changed, or put together, not for a utilitarian purpose, but solely to form a medium for the author's emotion, the latter have been called by the name of the *Fine Arts* (q.v.). This term is held to cover architecture, painting, and sculpture, but it does not extend, in common parlance, to music or letters. Possibly the difference at the root of this anomaly in nomenclature is that music and poetry exist in the abstract, and painting and sculpture in the concrete. That, however, would not prove that the former are any less fine as A.s than the latter. The 'A. of architecture,' as a term, also offers a little difficulty, for whilst in its highest flights architecture may answer every requirement of a fine A., it is in its dual character almost always concerned with the immediate wants of life, which fact is enough to put it outside one definition of A. at least. Macaulay declared it was half a science, and others have decreed it to be more science than A. On the other hand, it is often regarded as the oldest and greatest of the fine A.s, for the reason that painting and sculpture are subsidiary to the buildings they adorn. But that is as much as to say that the ring is more worthy than the engraved gem it holds; and as for priority, we know that the graphic A.s were flourishing before men began to build.

We are led to the conclusion that probably the part of architecture that is fine A. is in reality a variety of sculpture, for it works in 3 dimensions; its beauty and effect are due to design and proportion, and its surface markings count in the complete effect. These are conditions which otherwise sculpture alone fulfils.

Sculpture and painting remain with a standing against which there seems to be nothing to urge, and the popular idea of what fine A. signifies would appear to confirm this standing, though more than ever do the conditions of their pursuit to-day prove them dependent upon the margin that a strenuous age can spare for luxury.

All forms of graphic and plastic A. are admitted under the generic names of painting and sculpture, and can be broadly



Alinari

WINGED VICTORY OF SAMOTHRACE
Greek sculpture in the Louvre, Paris.

divided as *naturalistic* and *decorative*. This div. is often no more than one of point of view, for it is obvious that the Parthenon frieze was both, as were the pictures of the Venetian masters. The various sub-divs. of fine A., such as the *idealistic*, the *realistic*, the *literary*, and so forth, are necessary to lucid criticism, but they do not affect the question of A., for which all are mediums. The latest developments of naturalistic A. have rather forsaken the literary or story-telling phase, even in book illustration, which is now more decorative than naturalistic in its best forms. But literary A. will always make a strong appeal to the popular mind, which naturally thinks first of anecdote, being more alive to the joys and woes of life than to the finer-drawn sensations of A. for A.'s sake felt by critics.

The terms *idealistic* and *realistic* are used in criticism to signify 2 opposite methods of approach on the part of the

artist. The idealist is one who gives form to incidents and scenes that were generated partly or wholly in his own mind. He may, and usually does, get the germ of his subject from something seen, but the material is gestated, so to speak, and the result appears with more generalisation and psychological import than its actual prototype possessed. The realist, on the other hand, labours to give a likeness of things as they are; showing a sincere desire for truth, his efforts may

appalling could he render them by invention. It is the power of communicating the spiritual or romantic force of things to the spectator that constitutes idealism in A. The realist also might imagine scenes, but he would present them in such a way that they might be mistaken for topographical records. They might be beautiful examples of fine A., but they would not be ideal. Fine A. must interpret, however, and inasmuch as the spirit stirs more deeply than the letter, the idealist is in a better position than the realist to set up that correspondence of feeling between artist and beholder which fine A. demands.

Of decorative A. the great mass finds expression in the crafts and industrial A.s. Much of it takes the form of ornament. But mural painting and stained glass belong legitimately to the fine A.s when they rise above the level of commercial mediocrity (see MURAL DECORATION; FRESCO; STAINED GLASS). Recent years have witnessed an increasing movement against naturalism, as being a phase antagonistic to the idea of the space decorated. The idea of this space, it is held, should not be forfeited to pictorial ideas. In the belief that such matters as linear and aerial perspective, round modelling, natural action, modulated colour, and other characteristics of realism prevent the wall upon which they appear from looking like a wall, modern decorative artists have adopted archaisms as a safeguard against the naturalistic view of things. The great decorative painters, Michelangelo, Veronese, Rubens, and others, strove, on the other hand, to eliminate the idea of the wall, and to that end represented starry heavens in ceilings, columns, and openings in wall spaces, and gave to figures a perspective view from the floor. For the most part decorative A. shows signs of free growth only in sporadic efforts to burst the bonds of its conventions.

An altogether different view-point is, however, possible—namely, that which regards both the idealistic and the realistic approaches as belonging to the category of naturalistic A., and therefore as opposed to another conception of A. which stresses its abstract qualities; that is to say, the qualities which constitute design apart altogether from its relation to nature or the natural objects which it may represent. From that point of view the formalised lion so frequently represented in ancient sculpture is better A. than Landseer's lions on the Nelson Monument, and the Italians of the Renaissance, generally speaking, are better designers than the Flem. or Ger. artists of the period. Of recent years distinction between the naturalistic or representational and the purely aesthetic or abstract qualities of A. has become more and more emphatic, leading eventually to designs in sculpture and painting which show no or only a barely discernible relation to nature or natural objects. See also AESTHETICS; ARCHITECTURE; DESIGN; DRAWING; PAINTING; SCULPTURE.

The hist. of A. shows that it is not an



Alinari

MERCURY, OR THE LITTLE IDOL
A bronze antique in the Archaeological
Museum, Florence.

have a high quality as A. Turner presents an idealised view of nature whereas Constable approaches it in a realistic mood. The It. and Dutch schools of painting show the contrast forcibly. Sculpture offers Pheidias and Donatello respectively. But the case cannot be left so simply stated, because the 2 phases are, in a manner, combined in the finest works of A. It is evident that the idealist is really more in need of knowledge born of observation and study than is the realist, since the former does not oblige himself to copy from nature; and were he, moreover, not realist enough to carry conviction, his idealism would be but futile and meaningless. The more thoroughly a Turner could know the realities of sunsets and thunderstorms, the more magnificent or

isolated phenomenon, but is bound up with the hist. of civilisation. What is known as 'primitive' A. is not necessarily crude or ill-formed but the product of a certain type of early culture. The naturalism and vigour of cave A. is astonishing, though it belonged to a primitive society. In comparatively recent times the same wonderful power of animal drawing appears in the A. of the African Bushman (see BUSHMAN). We may go back to c. 4000 BC to find pottery with patterns that consciously emphasise the form and point to a pleasure in the craft, a refinement in the fashioning of tools. Among existing peoples with a primitive economy, Polynesians, Australian aborigines, or, at a somewhat different level, the Pueblo Indians, the same feeling for ornament and pattern exists. (See also CAVE ART; see L. Adam, *Primitive Art*, 1949.)

The connection between A., religion, and gov. develops in the early civilisations with organised city life. A. was an effort on the one hand to convey the power and magnificence of authority; and on the other to give visible shape and abode to the mysterious powers of the universe. Temple and palace were jointly the focus of the artist's activity. The dolmens and cromlechs of the Neolithic and Bronze Ages (see STONE AGE; BRONZE AGE; MEGALITH CULTURE; AVEBURY; STONEHENGE) point to the dawn of temple architecture, impressively perfected in Mesopotamia, Egypt, and, much later, in Mexico (see BABYLON; ASSYRIA; UR; EGYPT, *History*; MEXICO, *Archaeological Research*). The vast halls of Egypt with many columns, some of which were 70 ft high, were covered with coloured reliefs and held colossal statues 'in the round.' The advanced civilisation of Crete (see CRETE and AEGEAN CIVILISATION) yielded to the excavations of Sir Arthur Evans the vast palace of Minos, with paintings and sculpture of remarkable force and vividness. It is easy to understand why sculpture flourished in these early civilisations and why the representation of human beings became its main aspect. It gave a permanent record of success: of an Assyrian king triumphant in the lion hunt, muscular and invincible, of an Egyptian Pharaoh uniformly successful in battle. It also crystallised the idea of divinity. A god was a superior man, or alternatively a man with the added attributes of the animal creation. The need for working strictly to the requirements of ruler and priesthood accounts for the conventions governing A. in this ancient world. Only at rare intervals did it attain freedom or attempt to experiment (as in the reign of Akhnaton). It was the free mind of the Greek that produced the conception of A. that has had a lasting effect on Europe (see GREECE, *Greek Art*). It was idealistic in its attempt to conceive the perfect type of human being, and realistic in, for the first time, conveying what the human body was really like. By c. 450 BC Gk genius, in the persons of Phidias, Polyclitus, and Myron, had risen to the high level evidenced by the frieze of the Parthenon. All archaism had been

thrown off when Praxiteles, Scopas, and Lysippus added to the Phidian traditions greater facial expression and sweetness. The victories of Alexander closed the Hellenic period. From this time until the Rom. conquest the Hellenistic period extended. It added landscape to the scope of painting, and introduced emotional expression into sculpture, as in the 'Laocoön.' That the Greek was always a true artist every discovered object of common utility bears proof. Zeuxis, Apelles, and others were painters whose work we have to imagine; but decorated



Anderson

'THE VISIT OF MARY TO ST ELIZABETH,'
BY GIOTTO

In the Scrovegni Chapel, Padua.

vases survive in plenty which show beauty of form and grace of invention. Engraved gems have come down to us unspoiled by time. They have never been surpassed for the perfection of their beauty and skill. The Gk ideal in sculpture finds its only rival in the contemplative perfection of the Indian figures of Buddha.

The Romans, although they imported Gk artists and pillaged Gk soil for objects they had the taste to admire, were nevertheless the heirs of a native A. Etruscan A. had its own power (see ETRUSCAN AND ETRUSCAN ARCHITECTURE AND ART). The Romans, who, like the Assyrians, made use of the arch and the dome, produced viaducts, arenas, and other great works of utility. Their statues and reliefs are vigorous and realistic. Especially great are their vivid portrait busts (see ARCHITECTURE, Rome; POTTERY; SCULPTURE). From the Rom. A. and

architecture, influenced by oriental and Hellenistic A., evolved the Byzantine. The early Christian churches were modelled upon the Rom. basilica, and ornamented with mosaics stiff in design but gorgeous in colour. Byzantine A. avoided sculpture 'in the round' as appertaining to idols (see under BYZANTINE ARCHITECTURE and BYZANTINE ART). Its carvings, embroideries, and enamels were coveted all over Europe, and the epoch was one of great wealth and magnificence. The Rom. basilica, by the principles of the round and pointed arch, developed respectively into Romanesque and Gothic building (see ARCHITECTURE). The Gothic



Medici Society

RAPHAEL: SISTINE MADONNA

gave rise to a lively and human sculpture, in which naturalism revived.

The close connection of religion and A. was, as in pre-Christian times, a main element in the growth of civilisation. To begin with, the claims of religion once again tended to estab. conventions in A. The Gk delight in bodily perfection was incompatible with the task of expressing doctrine and spiritual discipline. Thus in the Middle Ages representations of the unclothed figure were timid and imperfect. Islam gives us a signal example of the effect of a monotheistic creed in banishing realistic representation altogether and substituting abstract design (see ARCHITECTURE, *Mohammedan*). European progress to the heights of the Renaissance (q.v.) was to some extent a return to the Gk freedom of realistic representation both in sculpture and painting. From the 14th cent. to the 16th cent. in Italy was a steady advance, from the first

efforts of Siena and Florence (see articles on Duccio and Cimabue) to, for example, the noble pictorial drama of Giotto (q.v.) and the naturalism of Masaccio (q.v.) in painting and of Donatello (q.v.) in sculpture (see ITALIAN ART and RENAISSANCE).

The Renaissance period dates from the 15th cent., when classic remains recalled men to the older ideals. Its result in architecture was that every nation adapted the classic elements to its own special needs. In sculpture and painting 3 great men represent supremely the passion for wide and exact knowledge combined with power and feeling that characterises the period—Leonardo da Vinci, Michelangelo, and Raphael (see individual articles). Leonardo's researches went beyond the bounds of A., but his few paintings are supreme in their expression of mysterious beauty. Michelangelo in sculpture and in his masterpiece in painting, the ceiling of the Sistine Chapel, showed a unique command of the human figure in expressive action. Raphael, 'the prince of painters,' is equally a master in vast rhythmic compositions and in small pictures of exquisite charm. Delight in bodily perfection and sensuous qualities of form and colour appeared in a wider range of subject-matter, mythological as well as religious, and is notable in Venice, which boasted the great names of Mantegna, Giorgione, Titian, Tintoretto, and Veronese (see articles on individual artists).

What came to be known (in the 18th cent.) as 'the Grand Style' was the special achievement of Italy. How A. is linked with racial character and differs with climate and environment is shown in the separate N. development of Gothic A. The soaring height of the Gothic cathedral opposed itself to the classic stability. In sculpture and painting there is an interest in realistic and sometimes grotesque detail, as opposed to generalised and ideal forms. Flem. painting (see FLEMISH ART), developing from the miniature into the minutely finished oil-painted panel (as opposed to the It. fresco), is an outstanding example, and such masters as Van Eyck, Memling, and Van der Weyden (qq.v.) display the N. realism at its best. Realism, a sombre or fanciful outlook, and much careful craftsmanship characterise Old Ger. art (see GERMAN ART, as in Grünewald (q.v.)), though some reflection of the Renaissance spirit appears in the great Dürer (q.v.) and of the Reformation in the highly individual portraits of Hans Holbein the Younger (q.v.).

Until the end of the 18th cent. the function of A. as an expression of secular power is as notable as its connection with religion. The portraits of Queen Elizabeth I are almost Byzantine in their formal reflection of authority and majesty. The idea of A. as propaganda for absolutism is to be seen in the immense decorative works of Rubens (q.v.); and even more strikingly in the France of Louis XIV (see FRENCH ART), when architecture, painting, and many forms of luxurious craftsmanship all ministered to the king's glory.

Yet A. in the post-Renaissance period

was already set on a new course and there was a growing independence of either religious or authoritarian rules. In Italy Caravaggio (q.v.), a born rebel, introduced the opposite of ideal types into ostensibly religious pictures, with violent effects of light and shade that were much copied. Velazquez (q.v.) in Spain, though an ornament of the Sp. court, was independent and realistic in his attitude to A. Claude and Poussin (q.v.), the greatest Fr. painters of Louis XIV's time, unaffected by its pomp, produced their masterpieces in Rome.

A tendency to reflect social life and surroundings is seen in Holland, freed from religious and political domination (see DUTCH ART). Protestant Holland in the 17th cent. had no call for religious works, but was prolific of portraits, *genre* subjects, and landscapes. Rembrandt, Hals, De Hooch, Ruysdael, Hobbema, Cuyp, and Vermeer are the names of some of the greatest men of this glorious epoch of healthy naturalistic A.

In the 18th cent. this trend continued. Fr. A., with Watteau, Fragonard, and Boucher (q.v.), reflects a charming and gay society. Chardin (q.v.) pictures middle-class life. In Italy Canaletto, Guardi, and Loughi (qq.v.) bring Venice and its life before us. England develops a national A. (see ENGLISH ART), eminently social in character. Hogarth (q.v.) substitutes moral lessons for religious fervour in pictures of modes and manners. The portrait painters, Reynolds, Gainsborough, Romney, Raeburn (qq.v.), are less formal than their predecessors in their appreciation of character. Sporting and rural scenes reflect the taste for country life. Landscape was one of the triumphs of secular A. and perhaps the most important Eng. achievement, with Wilson and Gainsborough (qq.v.) in the 18th cent. and Turner and Constable (qq.v.) in the earlier part of the 19th cent. The rise of the water-colour school, reflecting an interest both in foreign travel and in the scenery and antiquities of Britain, is a splendid phase of landscape, in which the names of Turner, Girtin, Cozens, De Wint, Cotman, and Bonington stand out (see articles on individual artists).

Two great events, the Fr. Revolution and the Industrial Revolution, brought further change in the idea of A., and connection with estab. institutions and forms of patronage was broken. The result was to let individual expression take its own course, to make the artist a critic of, or a rebel against, society, or one who concentrated solely on his aesthetic problems, as may be seen from the 'movements' that characterise the 19th cent.

It began with that conflict between emotion and discipline in A. that is represented by Romanticism against Classicism. In France there is Delacroix (q.v.) on the one side, Ingres (q.v.) on the other. In romantic mood, artists turned to nature. Eng. landscape had a powerful effect in France, and its influence is seen on Corot (q.v.) and the members of the famous Barbizon School (see BARBIZON). Another aspect of Romanticism was a discontent with the present that led artists to seek

style and inspiration in the past and more specifically in the A. of the Middle Ages. This trend is observable in architecture (the Gothic Revival), the industrial A.s (as shown, for example, at the exhibition of 1851), and the subject-matter of painters—though the results have never commanded unreserved admiration. Painters of the realist school, however, were willing to face the contemporary problem: Courbet (q.v.) in France, later the Impressionists (see IMPRESSIONISM); in England Pre-Raphaelitism in an early phase (see PRE-RAPHAELITE BROTHERHOOD). The idea



Mansell

'PORTRAIT OF THE ARTIST'S WIFE,' by
JAN VAN EYCK
Flemish School, Bruges.

of 'A. for A.'s sake' emerged, proclaiming the artist's freedom from all other ends except the creation of beauty. In England it produced some absurdities (see AESTHETICISM), but in France many painters lived solely for their A. (and for the first time in hist. completely divorced from a public), this isolation being dramatically illustrated by the 3 great figures of Cézanne, Gauguin, and Van Gogh (see individual articles; also POST-IMPRESSIONISM).

At the same time the 19th cent. had its 'popular A.' in many ways defective. Even the serious idealism of Watts (q.v.) and Leighton (q.v.), and the great abilities of Millais (q.v.), suffered from its general tendency. The new phenomenon of a wealthy middle class, avid of culture but without standards of aesthetic judgment, produced A. appealing to a love of sentiment and anecdotes in painting, and of meaningless elaboration and ornament in design. In opposition to this Wm Morris (q.v.) conceived the idea of a true popular

A., produced by the people in general, inherent in all their work, 'the expression of joy in labour.' Morris stimulated the revival of hand-craftsmanship and the A.s and Crafts movement that still has its adherents and had much influence in Germany and Austria (see ART NOUVEAU).

Some radical adjustments of view have been made in the last hundred years. An extended knowledge of A. in different parts of the world through archaeological discovery, the spread of communications, and other factors has made it clear that the Renaissance ideal and the views of

recommendation. Reviewing their complex inheritance original spirits in Europe turned to first principles, with a consequent rejection of the highly developed imitative A. of the time. The greatest individual influence was Cézanne (q.v.), who began as an impressionist but was driven to seek for basic principles of structure in nature that the impressionists had ignored. His insistence on the importance of geometry as the basis of form had its effect in the growth of Cubism (q.v.) and the work of its exponents, Picasso, Braque, Léger (qq.v.), and others. An abstract geometric A. was the logical conclusion, and a similar process of thought to that evinced in painting is evident in the austere simplicity of modern architecture (see ARCHITECTURE) and in the design of various objects of use (see INDUSTRIAL DESIGN).

Another aspect of the return to essentials is the value set on primal emotion, or natural and instinctive expression. Van Gogh (q.v.) is an example of the true 'expressionist' (see EXPRESSIONISM). The pursuit of this end is marked by the interest in naïve painters (e.g. Henri Rousseau 'Le Douanier,' also in the spontaneous A. of children. The relation of A. and the subconscious mind has been exploited by the Surrealist movement (see SURREALISM), an attempt to visualise the dream-life studied by psycho-analysis, as in the work of Dali and Ernst (qq.v.).

Somewhat apart, though developing from Cubism and Expressionism, was the short-lived movement, Futurism (q.v.), a whole-hearted acceptance of the machine age and rejection of the past, which fl. briefly in Italy, had its reflection in Eng. Vorticism (see WYNDHAM LEWIS), and gained a foothold in Russia in 1914. In the first fervour of Bolshevik revolution the Futurist conception of a 'machine A.' was enthusiastically taken up, though it has now been abandoned for some 30 years.

This breathless succession of new movements, accompanied by challenging manifestoes, shows how strongly the need has been felt to create a modern A., and their impact has been felt in every country and every form of A. They do not necessarily invalidate the work of artists who still belong to earlier or different traditions, as for instance Augustus John (q.v.) or Walter Sickert (q.v.); yet an essential difference marks off the specifically 'modern' work of A. Though post-impressionist developments have known many varying and sometimes contradictory aims, they have one thing in common: they all regard the work of A., whether sculpture or painting, primarily as a reality and not as an illusion or counterfeit of nature. In this sense there is a sharp cleavage between academic, idealistic, realistic, romantic, or impressionist A. on the one hand and modern A. on the other: the former categories being founded on appearances of nature, while the latter rests on the artist's inherent creative will (Wm Blake, q.v., gives a striking and solitary anticipation of this in an earlier day).



Mansell

'ISABELLA OF PORTUGAL,' BY TITIAN
Prado, Madrid.

18th-cent. aestheticians, based on the classic productions of Greece and Italy, are no longer the sole criteria. The stages were successively (1) the 'discovery' of the It. 'primitives' (see PRIMITIVE PAINTING); (2) the 'discovery' of the A. of the Far E. The Jap. colour prints (q.v.) that began to arrive in Paris c. 1860 modified ideas of composition and controlled colour harmony. The influence may be seen in Whistler's 'Battersea Bridge' (Tate Gallery), the posters of Toulouse-Lautrec, the drawings of Beardsley. The brilliance of the Persian miniature (see PERSIA, Art) and the calligraphic poetry of Chinese landscape (see CHINESE PAINTING) have in this cent. been brought freshly to W. eyes in the series of great Royal Academy exhibitions; (3) the 'discovery' of aesthetic value in forms of A. once dismissed as crude, e.g. African sculpture, Iberian sculpture, pre-Columbian Amer. sculpture, their powerful grasp of essentials in form being a main

In the post-war period one sees the continuing production of 'abstract' or non-representational A., equally in painting and sculpture: even more perhaps in the latter than the former. Henry Moore (q.v.) and Barbara Hepworth (q.v.) illustrate this strikingly, all the more if we turn back for comparison to the neo-classicism of Flaxman (q.v.) or the Renaissance revival of Alfred Stevens (q.v.). Such a distinguished naturalistic painter as Victor Pasmore has since 1951 abandoned his earlier aims, to devote himself

the Second World War the products of child A., encouraged in schools, have been frequently exhibited to an interested public. The therapeutic value of painting and drawing, in hospitals and periods of convalescence, has been observed (see A. Hill, *Art Versus Illness*, 1947); and the example of Sir Winston Churchill (*Painting as a Pastime*, 2nd ed. 1949) has its encouragement for the amateur. Contributors to a 'Painting for Pleasure' exhibition in 1955 (who included King Feisal of Iraq, the Duchess of Gloucester,



'LE PONT DE CRETAIL,' BY CÉZANNE

Volland

This painting was formerly known as 'Le Pont de Melun.'

to experiments in pure form; nor has he been alone. On the other hand there is a rival trend to a new or reformed realism, both in France and England. Their coexistence must be accepted and it is well to bear in mind that we must judge finally by individual qualities, which necessarily vary, rather than in terms of allegiance to one movement or another.

Public appreciation, as one would expect, has hardly kept pace with the swift development of 20th-cent. A., though recurrent controversies are evidence of its trenchant effect. Painting which shows the characteristic vividness of modern colour finds acceptance with many on this account, as the present trend in colour reproductions goes some way to prove. The idea of free expression in A., outside the professional sphere, has had a noteworthy expansion in recent years. Since

Colonel J. J. (now Lord) Astor, and Mr Noel Coward) concurred in the view that 'painting is the best of all means of escape from the trials of life and work.'

Bibliography. A. Furtwangler, *Masterpieces of Greek Sculpture*, 1895; E. Gardner, *Handbook of Greek Sculpture*, 1896; R. Muther, *History of Modern Painting*, 1896; Lady Dilke, *French Architects and Sculptors of the Eighteenth Century*, 1900; W. Ridgway, *The Early Age of Greece*, 1901; B. Berenson, *The Study and Criticism of Italian Art*, 1901-2; L. F. Freeman, *Italian Sculptors of the Renaissance*, 1902; W. Budge, *Egypt in the Neolithic and Archaic Periods*, London, 1902; R. C. Witt, *How to look at Pictures*, 1902; H. Wölfflin, *The Art of the Italian Renaissance*, 1903; C. Mauclair, *The French Impressionists*, 1903; L. Dimier, *French Painting in the Sixteenth Century*, 1904;

C. G. Hartley, *A Record of Spanish Painting*, 1904; W. R. Lethaby, *Medieval Art*, 1904; J. Capart, *Primitive Art in Egypt*, London, 1905; Richter and Taylor, *The Golden Age of Classic Christian Art*, 1905; S. Reinach, *Apollo* (hist. of A. through the ages), London, 1907; E. Fromentin, *Masters of Past Time* (trans.), 1912; J. A. Crowe and G. B. Cavalcaselle, *History of Painting in Italy* (new ed.), 1918; Charles Marriott, *Modern Movements in Painting*, 1920; Roger Fry,



Copyright Glasgow Art Gallery Collection
SALVADOR DALÍ: 'CHRIST OF ST JOHN
OF THE CROSS'

Vision and Design, 1920; Elie Faure, *History of Art* (Eng. trans.), 1921; Sir Arthur Evans, *Palace of Minos*, 1922; Frank Rutter, *Evolution in Modern Art*, 1926; S. Sitwell, *German Baroque Art*, 1927; R. H. Wilsenki, *The Modern Movement in Art*, 1927; Baldwin Brown, *The Art of the Cave-Dweller*, 1928; A. Clutton-Brook, *An Introduction to French Art*, 1931; O. E. Saunders, *English Art in the Middle Ages*, 1932; Herbert Read, *Meaning of Art*; Art Now; Henry Moore, 1934; Geoffrey Grigson (ed.), *The Arts To-day*, 1935; L. Ashton and B. Gray, *Chinese Art*, 1935; D. T. Rice, *Byzantine Art*, 1935; J. Lipman, *American Primitive*

Painting, 1942; K. De B. Codrington, *Study of Indian Art*, 1944; H. Frankfort, *Art and Architecture of the Ancient Orient*, 1944; T. Bodkin, *The Approach to Painting*, 1946; L. Venturi, *Modern Painters*, 1947; J. Rewald, *The History of Impressionism*, 1947; C. G. E. Bunt, *Russian Art*, 1947; W. Johnstone, *Child Art to Man Art*, 1947; R. Goldwater and M. Treves, *Artists on Art*, 1947; L. Binyon, *Art of the Far East*, 1950; A. Hauser, *The Social History of Art*, 1951; L. H. Bulley, *Art and Everyman*, 1951; L. Mumford, *Art and Technique*, 1952; E. H. Gombrich, *The Story of Art*, 1952; H. Wölfflin, *Principles of Art History*, 1953; E. von Sydow, *Afrikanische Plastik*, 1955; A. H. Barr, *Masters of Modern Art*, 1955.

Art and Part. In Scots Law no distinction is made between the commission of a crime and accession to it. Any person who aids the execution of a crime is said to be guilty A. and P. Guilt by accession may be incurred by advice, assistance, or incitement either prior to or at the time of the criminal act. Accession after the fact is not a crime in Scots Law except in treason.

Art Exhibitions. Whether organised for profit or otherwise, A. E. have become increasingly popular in modern times. Art galleries are always open in London with private shows of the works of artists who are offering them for sale; while, in recent years, public interest in art has been stimulated by the admirable series of ancient and modern A. E. organised by the Royal Academy of Arts, and also (since 1945) by the Arts Council. The Festival of Britain year, 1951, saw exhibitions distributed all over the country according to the local connections of artists, e.g. Gainsborough at Bath, Reynolds at Plymouth, etc. The most popular annual exhibition in London is that of the Royal Academy, first held in Pall Mall in 1768, and afterwards in Burlington House, where the 189th summer exhibition was held in 1957. The exhibits include oil-paintings, water-colours, designs in architecture, miniatures, engravings, etchings, and sculpture. Other important Academy exhibitions have since the war included 'The King's Pictures' (1946-7), 'Indian Art' (1947-8), 'Landscape in French Art' (1949-50), 'Holbein and his Age' (1950-1), 'L'Ecole de Paris, 1900-1950' (1951), 'Dutch Pictures' (1952-3), 'Flemish Art' (1953-4), and 'European Masters of the 18th century' (1954-5). Arts Council sponsorship has given, since 1946, a full view of continental moderns: Picasso, Klee, Braque, Rouault, Léger, Dufy, Munch; and such exceptional exhibitions as the 'Van Gogh' (1947), 'Masterpieces from the Vienna Galleries and Pinakothek, Munich' (1948, 1949), and 'Mexican Art' (1953). European exhibitions show alike development in scale and in scholarship; from many one might instance 'French Drawing from Fouquet to Cézanne' (Orangerie, Paris, 1950) or 'Giorgione and the Giorgionesques' (Venice, 1955).

The Royal Society of Painters in Water-Colours ('Old Water-colour Society'), Conduit Street, exhibits works of its

members and associates in the spring and autumn of each year; the Royal Institute of Painters in Water-Colours, 195 Piccadilly, exhibits annually works of any artists selected by their committee. In the same building the Royal Institute of Oil Painters gives exhibitions in the autumn on the same principle. The Royal Society of Brit. Artists, Suffolk Street, S.W., exhibits works of outside artists as well as of members; the Royal Society of Painter-Etchers and Engravers, Conduit Street, exhibits yearly works of its members and associates; the Royal Society of Portrait Painters, founded in 1891, with a limited membership, selects works of members and non-members. Ann. exhibitions of the New Eng. Art Club and London Group consist of works which the artists have felt to be outside the scope of other exhibitions.

The Royal Scottish Academy of Painting, Sculpture, and Architecture, Princes Street, Edinburgh, incorporated 1838, and the Royal Hibernian Academy of Arts, in S. Frederick Street, Dublin, also hold exhibitions; and in Wales the Royal Cambrian Academy of Arts exhibits in Conway.

Other well-known galleries with frequent exhibitions in the provs. are the Royal Glasgow Institute of Fine Arts, the Royal W. of England Academy, the Royal Birmingham Society of Artists, and the Walker Art Gallery, Liverpool.

Art Museums and Galleries. The world's public art galleries of to-day are almost entirely of 19th-cent. or later foundation even when depending on works accumulated in the past. The prin. collections of art treasures in Britain include: *London:* The British Museum (q.v.); Victoria and Albert Museum (q.v.); National Gallery (q.v.); National Portrait Gallery (q.v.); Tate Gallery (q.v.); Wallace Collection (q.v.); Sir John Soane's Museum (see SOANE); Dulwich Gallery (see DULWICH); Hampton Court Palace (q.v.); Kenwood House (see IVEAGH). The Guildhall Art Gallery, City of London, is noted for its paintings of civic occasions and ceremony. The National Maritime Museum, Greenwich (q.v.), and Royal United Service Museum, Whitehall, are of artistic interest in their collections of paintings and engravings of service hist., ship models, etc. Apsley House, presented to the nation by the present Duke of Wellington, has notable paintings by Velázquez and other masters. It was opened to the public in 1952.

Provinces. The many municipal museums and galleries need not be listed here, but the healthy tendency to revise and improve Victorian and Edwardian foundations by the addition of good modern work is to be remarked. Notable collections are the Birmingham Museum and Art Gallery, the Walker Art Gallery, Liverpool, and the Manchester Corporation Art Galleries (each with fine examples of the Brit. school and the Pre-Raphaelites in particular); Norwich Castle Museum and Art Gallery (for the 'Norwich School' especially); and Temple Newsam House, Leeds (pictures in period setting). The

Ashmolean Museum, Oxford (q.v.), and Fitzwilliam Museum, Cambridge (q.v.), have excellent picture galleries, and the former a very important collection of master drawings. The National Gallery of Scotland, Edinburgh, National Museum of Wales, Cardiff, and National Gallery of Ireland, Dublin, have collections of wide range. The Glasgow Art Gallery also requires special mention.

Dominions: See DOMINIONS ART MUSEUMS. *U.S.A.:* See AMERICAN ART MUSEUMS.

Europe. The great art collections on the Continent are those of the Louvre (q.v.), Paris; the Prado (q.v.), Madrid; the Uffizi (q.v.) and Pitti Palaces, Florence; the Vatican (q.v.) and Villa Borghese (see ROME); the Accademia (q.v.), Venice; the Brera Gallery (see MILAN); the Art Hist. Museum, Vienna (see VIENNA MUSEUMS); the Old and New Pinakothek, Munich; the Dresden Gallery; State Museum, Berlin (see GERMAN ART MUSEUMS); Rijksmuseum, Amsterdam, and Mauritshuis, The Hague (see DUTCH ART MUSEUMS); Antwerp Museum of Fine Arts and Palais des Beaux Arts, Brussels (see BELGIAN ART MUSEUMS). Other notable collections are at Athens, Budapest, Copenhagen, Naples, Oslo, Leningrad, Moscow (Museum of Modern W. Art), Stockholm, and Zürich. See also MUSEUMS. See H. Tietzel, *Treasures of the Great National Galleries*, 1955.

Art Nouveau, the 'new art' of the late Victorian (c. 1890) and Edwardian periods. It has two aspects: (1) as a decorative style, noted for extravagant curvature, and a late offshoot of Pre-Raphaelite floral design, flourishing in Austria and Germany, where the influence of Wm Morris in handicraft and Aubrey Beardsley in draughtsmanship was strongly felt; (2) a desire for a new simplicity in architecture, exterior and interior, with which its decorative side is sometimes curiously combined. Among the architects and craftsmen associated with the movement are C. R. Ashbee (1863-1942), George Walton (1867-1933), C. F. A. Voysey (1857-1941), and, outstandingly, C. H. Mackintosh (1868-1928) (Glasgow School of Art, 1897, the 'House of an Art Lover', Darmstadt, 1902). The metalwork of Sir Alfred Gilbert, the sculptor of 'Eros', and in France the glassware of René Lalique show the ornamental aspect of A. N. to advantage. See N. Pevsner, *Pioneers of the Modern Movement*, 1949; also *Victorian and Edwardian Decorative Arts* (Victoria and Albert Museum picture book), 1952.

Art Sales. Change in social conditions in England has had a notable effect on A. S. The maintenance of mansions or ancestral homes having become increasingly burdensome, through economic stringency and high taxation, heirlooms have been sold for the high prices they have been able to command. These sales often attract public attention, partly on sympathetic grounds and partly through excitement roused by Amer. competition. This rivalry in art collection existed in pre-war days, but not to so great an extent. Yet there were some very

notable A. S. before the war; e.g. Lord Duveen paid £1,000,000 in 1907 for the Rodolphe Kann collection of pictures and *objets d'art*, including a dozen splendid Rembrandts. In the following year the Holland sale realised £138,000 for some 400 lots, which was a record sum for a collection of paintings by modern artists. In 1910 the Yerkes sale in America brought in over £2,707,000, including the sum of £137,000 for Frans Hals's 'Portrait of a Woman'; and the E. H. Gary sale brought in \$2,297,000, including \$270,000 for Gainsborough's 'The Harvest Wagon.' Mantegna's 'Madonna and Child' sold for £31,000 in 1912 in Berlin, and about the same time Rembrandt's portrait of his son Titus was sold in the U.S.A. for \$270,000. In 1915 and 1916, during the early part of the First World War, there was naturally a slump in the sale of heavily priced pictures, though in 1917 Reynolds's portrait of Lady Ann Fitzpatrick as 'Sylvia' was sold for nearly £20,000. But after the war prices soon began to rise and, in 1919, the Hamilton picture sale brought in £169,000, including £6500 for Turner's drawing of 'Zürich' and £26,700 for Hals's portrait of Joseph Coymen. The sale of Sargent pictures in 1925 showed a total of £146,000 for 160 lots in one day, but sentiment played some part in the result. But in 1923 the total sum at the auction of the pictures of Sir John Robinson was only £200,000, though the lots included over 100 old masters, numbers of them failing to reach the reserve price. In 1927, however, a record was created in that more than 130 pictures priced at sums exceeding 1400 guineas each had changed hands during the year.

For many years the paintings which have realised the highest prices at auction sales have been mainly portraits by Rembrandt, Gainsborough, Romney, Hoppner, Van Dyck, Reynolds, and Raeburn. But there has also been an increasing demand for paintings of the 19th-cent. Fr. school: Courbet; Corot; the Impressionists—Manet, Monet, Renoir, Pissarro, Sisley; Cézanne, Gauguin, Van Gogh, Seurat, and such lesser artists in the same historic current as Boudin or Signac. A painting by Boudin was sold in Paris in 1951 for 910,000 francs. Record high prices were obtained at the Cognac sale of 1952 in Paris, Cézanne's 'Apples and Biscuits' selling for the equivalent of £38,500, Renoir's 'Young Girl with Hat' for £26,500, and Van Gogh's 'Thistles' for £19,500. These do not fetch the extraordinary prices realised by the old-established masters, though Cézanne's 'Vieille au Chapelet' was bought in 1954 for the National Gallery for about £30,000. A. S. also show the high value now attached to works by famous painters of the modern school such as Picasso, Matisse, and Braque. It was noted that at the Hôtel Drouot in 1951 (its centenary year) paintings by Matisse were sold for a million francs each. Probably the record figure for any picture was that obtained by Lady Desborough for the Cowper 'Madonna' by Raphael, the price being

about £175,000. The 'Cornaro' Titian, bought for the nation from the Duke of Marlborough for £120,000, also ranks very high in the list of the record prices. In the private sale of the Duke of Westminster's collection was included Gainsborough's 'The Blue Boy,' which was sold for the Huntington collection of California for well over £100,000, while in the same sale Reynolds's 'Mrs Siddons as the Tragic Muse' was sold for little less than £100,000. 'The Blue Boy' was actually bought in 1803 by John Hoppner for £65, having been sold 7 years earlier for half that price. Up to that time the highest price at any auction for a Gainsborough picture was £20,000, which was paid for 'The Market Cart.' In 1926 Gainsborough's portraits of Miss Tatton and Master Heathcote each fetched £16,000. £100,000 was paid by a Philadelphia buyer for Lord Lansdowne's 'Mill' by Rembrandt, and the same sum was realised for Frans Hals's 'The Artist's Family,' Reynolds's portrait of Lady Betty Compton, and the portrait of King Philip IV by Velazquez. Other high prices include the following: Gainsborough's 'Hon. Ann Ducombe,' £84,000, and the same painter's 'Harvest Wagon,' £72,000 (resold in America in the Gary collection); Holbein's 'Duchess of Milan,' bought for the nation for £82,000; 'A Spanish Statesman' by Velazquez, £80,000; the portrait of Mary M. Barrett (known as 'Dinkie') by Lawrence, 74,000 guineas; Piero della Francesca's 'Crucifixion'—a small wood-panel—£75,000; Romney's beautiful portrait of Mrs Davenport, £60,900; Rembrandt's 'Man Holding a Scabbard,' 48,000 guineas; the Rokeby 'Venus and Cupid,' by Velazquez, bought for the nation for £45,000; Van Dyck's 'Portrait of Anton Triest,' £29,000; Gainsborough's 'Anne, Countess of Chesterfield' and Van Dyck's portrait of Jacques le Roy, each 17,000 guineas; Hobbema's 'Woody Landscape,' £15,750; and Hals's 'Portrait of a Gentleman,' £9000. These 2 last-mentioned prices illustrate the capriciousness of taste in some cases, for Hobbema's picture was sold in 1890 for £3400 and again, in 1938, for 3500 guineas, while that of Hals changed hands in 1884 for 4 guineas. The Eng. National Gallery secured Raphael's 'Ansidei Madonna' in 1885 for only £70,000 from the Duke of Marlborough, while J. Bache, a New York banker, paid £120,000 for the sole example of a male portrait by the same master. In 1947 a set of 12 floral studies by Jacob van Huysum, painted in the 18th cent. for a comparatively modest fee, was sold for £13,500. See also CHRISTIE'S; NATIONAL ART COLLECTION FUND; NATIONAL GALLERY.

The sale in 1951 of a Leonardo da Vinci drawing from Lady Melchett's collection (bought by the Metropolitan Museum, New York, for £8000), of a Guardi drawing at the Ashburnham sale in 1953 for £4500, and of 9 etchings by Goya at Sotheby's in 1952 for £1800 shows the high value which attaches to graphic art.

The leading sales rooms in London are

Christie's, King Street, St James's, SW.; Sotheby's, New Bond Street, W.; Robinson & Foster, Queensberry Hall, S. Kensington, SW.; Puttick & Simpson, New Bond Street, W.; and Knight, Frank & Rutley, Hanover Square, W. Details will be found in the ann. vols. of *Art Prices Current*, and in *The Year's Art*.

Arta, tn and dept of Greece. It derives its name from the R. A., or Aracthus, on which it stands. This riv. was, before the Balkan war of 1912, the frontier between Greece and Turkey. A. has many fine buildings, among which are a Byzantine castle; a palace belonging to the Gk metropolitan; the church of the Virgin of Consolation, and other Byzantine churches of the 13th and 14th cents. There is a famous medieval bridge. Chief manufs. are woollens and cottons, embroidery, Russian leather. Soil is fertile, and gardens and orchards surround the tn. In 1083 it was taken by Bohemund of Tarentum, in 1449 by the Turks; 1798 Ali Pasha captured it; 1881 ceded to Greece. Pop.: dept, 72,700; tn, 13,000.

Arta, Gulf of, or Ambracian Gulf, an arm of the Ionian Sea, about 23 m. long. From 1832 till 1912 its N. shores belonged to Turkey and its S. to Greece. Fish are plentiful, especially eels, mullets, and soles. On its shores are ruins of many ant. castles.

Artabanus, name of 4 Parthian kings.

Artabanus I succeeded his nephew Phraates II c. 127 bc, and perished in battle against a Mongolian tribe.

Artabanus II (c. ad 10-40), made king by a party of nobles who rejected Vonones I, the Rom. nominee, who fled to Armenia. When A. invaded the latter country Tiberius sent Germanicus to restore peace. Later Tiberius, at the instance of A.'s Parthian opponents, sent Vitellius to enforce Rom. authority in the E. A. eventually concluded a treaty with Vitellius and renounced the throne. See Tacitus, *Annals*, ii. 3 sqq.

Artabanus III reigned for a short time in ad 80 and the following years.

Artabanus IV, last Parthian king, in Babylon till ad 222. He defeated Macrinus (217), and was killed in battle 226.

Artabazus: 1. Persian general in the army of Xerxes, served under Mardonius at Plataea (479 bc).

2. Persian general under Artaxerxes II, Artaxerxes III, and Darius III. One of his daughters, Barsine, became by Alexander the Great mother of a son named Hecates.

Artanthe Elongata, shrub of the family Piperaceae, a native of Peru, remarkable for the styptic property of its leaves, which are used for stanching wounds.

Artaxerxes I (465-424 bc), son of Xerxes, King of Persia. In his time peace was restored between Persia and Athens after a war of 51 years. A. gave Ezra permission to return to Jerusalem with 1500 Jewish families.

Artaxerxes II, Mnemon (405-350 bc), King of Persia, succeeded his father Darius II. His reign is marked by the revolt of Cyrus, his younger brother,

who was assisted by 10,000 Greeks, and was defeated at Cunaxa in 401. The peace of Antalcidas (387) terminated the wars with the Greeks. Shortly afterwards a widespread revolt of the satraps in the W. provs. took place, which collapsed after the defection of the Pharaoh Takhos, although disturbances were still going on at the time of A.'s death.

Artaxerxes III, or Ochos (359-338 bc), King of Persia, succeeded his father, A. II. He murdered 2 of his brothers, and afterwards put to death all the remaining branches of the family. He put down the revolt of the satraps which had begun under his father, and reconquered Egypt. A. was poisoned by his eunuch Bagoas.

Artedi, Peter (1705-35), distinguished Swedish naturalist, b. Anund in Angermanland, Sweden, and was drowned in a canal at Amsterdam. He went to the univ. at Upsala, where he was a fellow student with Linnaeus. He first studied philosophy and theology, but gave up these studies for medicine and natural hist., especially the study of fishes. In 1734 he came to London, where he wrote the preface to his *Ichthyologia*, which work took sev. years to complete. He assisted Linnaeus in his *Systema Naturae*, and Albert Seba in his work on natural hist. His works, including *Ichthyologia* and *Synonymologia*, were pub. by Linnaeus in 1738.

Artemidorus: 1. Gk geographer, lived c. 100 bc. The 11 books of his work on general geography are lost, but we possess small fragments as well as some longer excerpts from an abridgment made in the 5th cent. ad by Marcianus of Heraclea.

2. Soothsayer and dream interpreter who lived about the 2nd cent. ad, during the reigns of Hadrian and Antoninus. Called himself Daldianus. His work on interpretation of dreams is said to have been written by command of Apollo Daldianus. The work is in 4 books, and gives a valuable insight into ant. superstitions.

Artemis, Gk goddess, daughter of Zeus by Leda, and twin sister of Apollo (q.v.). Like Apollo, she was of non-Hellenic origin, but at first had no connection with him. She was worshipped in pre-Hellenic Greece, Asia Minor, and Crete as 'an earth goddess associated essentially and chiefly with the wild life and growth of the field and with human birth' (J. Farnell, *Cults of the Greek States*, 1896-1909). Her care extended particularly over the young of every species. Under the influence of Homeric religion her character as a universal mother was largely obscured, and she became rather the virgin huntress, patroness of chastity. But much of her earlier character remained. She was always, for example, a goddess of child-birth; and at Ephesus her distinctive position as a universal mother was represented by the many-breasted figure in her temple there. A., like Hecate and Selene, with whom she was sometimes identified, was associated with the moon because of its supposed influence upon organic and erotic life. She was identified

with the Dorian goddess Orthia, and later by the Romans with Diana. See W. K. C. Guthrie, *The Greeks and their Gods*, 1950.

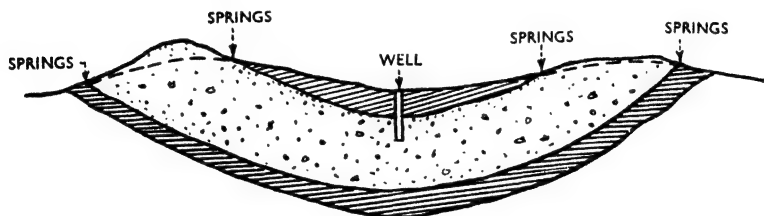
Artemisia: 1. Queen of Halicarnassus in Caria, one of the allies of Xerxes at the famous battle of Salamis, 480 BC.

2. Another queen of Halicarnassus, wife and successor of Mausolus (353-350 BC). She is noted for her love for him, the extraordinary grief with which she mourned his loss, and the magnificent monument which she built to his memory. This monument, called the Mausoleum, was adorned with fine Gk sculptures, portions of which were discovered in 1857 and are now in the Brit. Museum.

Artemisia, genus of Compositae very common in N. countries, has many species noted for their bitterness. *A. vulgaris*, Mugwort; *A. absinthium*, Wormwood; *A. maritima*, Sea Wormwood; and *A.*

of elasticity involves an increased resistance to the blood current, and consequently increased strain on the heart. The disease is caused by the toxins of rheumatism and syphilis; by chronic alcoholism and lead poisoning; by overstrain and overeating; and in association with chronic nephritis (q.v.). A form of arterio-sclerosis known as athero-sclerosis is part of the degenerative process of old age. The other chief affection of the A.s is *aneurism* (q.v.).

The *aorta* is the large A. rising from the left ventricle of the heart, which curves round in an arch, proceeding downwards until it bifurcates into the right and left *iliac* A.s at the level of the 4th lumbar vertebra. The head, neck, and upper limbs are supplied by the *innominate*, which, arising from the arch of the aorta, divides into the *right common carotid* and



ARTESIAN WELL

campestris, Field Southernwood, are Brit. species. *A. abrotanum*, Lad's Love, Old Man, or Southernwood, has a peculiar aromatic scent, and is found in S. Europe and the E.; *A. stelleriana*, Old Woman or Dusty Miller, a garden escape, is from NE. Asia. *A. dracunculus* is tarragon (q.v.).

Artemisium, in anct geography, a cape of N. Euboea, Greece, off which a famous naval battle was fought between the Greeks and the Persians in 480 BC.

Artëmovsk (until 1920's *Bakhmut*), tn in the Stalino Oblast of E. Ukraine, 40 m. N. of Stalino, the biggest centre of salting in the U.S.S.R. Local cultural centre. Pop. (1956) 57,000 (1897, 19,000; 1939, 55,000). Known since 1571 as fort and salt works; in 1783; administrative centre of Donets coal-mining industry, 1920-4.

Artemus Ward, see BROWNE, C. F.

Arterio-sclerosis, see ARTERY.

Artery, one of the tube-like vessels through which the blood is propelled by the heart to all parts of the body. They consist of sev. coats: the outer, or *tunica adventitia*, composed of connective tissue; the *yellow elastic coat*; the *muscular coat*; the *elastic penetrated coat*, which is perforated by small apertures; and the *tunica intima*, composed of endothelial cells. The walls undergo degeneration in cases of *arterio-sclerosis*; the elastic coats are destroyed or greatly impaired, and the other walls are thickened. This loss

of the *right subclavian*; the *left common carotid* and the *left subclavian* each arise independently from the aortic arch. The carotids supply the organs of the head, and the subclavians passing through the armpits are called *axillaries*, *brachials* as they pass down the upper arms, bifurcating into the *radial* and *ulnar* A.s in the forearms. Branches are given off from the aorta to supply the tissues of the heart and the viscera of the abdomen. The *iliac* bifurcates into the *internal iliac*, supplying the pelvic viscera, the organs of generation, etc., and the *external iliac*, which becomes the *femoral A.* as it descends the thigh and runs to the back of the limb, where it is called the *popliteal A.*, bifurcating into the *anterior tibial* and the *posterior tibial A.s*.

The *pulmonary A.* springs from the right ventricle of the heart, and bifurcates into branches for supplying the right and left lungs with blood.

Artesian Wells. The term A. W. is used strictly to apply to wells from which water rises under hydrostatic pressure and overflows at the surface. If the water rises insufficiently to overflow, the well is a *sub-artesian* well. The term has also been loosely used for bored wells, not necessarily artesian (see WELL BORING).

The principle is illustrated in the figure, which shows a geological section of natural rock structure, impermeable rocks being hatched and permeable rocks stippled. Rain falls on the permeable stratum until

the rocks are saturated up to the level of the 'water table' (shown by a broken line), after which it overflows at the surface at springs. If a well is bored through the upper impermeable stratum into the permeable stratum, as shown and the head of the well is below the water table, water will rise to, and overflow from, the head of the well, which is therefore an artesian well.

A. W. are of great value when the supply of surface water is insufficient. In Queensland and S. Australia the scanty rainfall is often supplemented by water drawn in this way from great depths. Watercourses that usually run dry in summer have been converted into permanent streams by the surplus from these wells, and it is estimated that the yield in Queensland is equivalent in irrigating effect to a yearly rainfall of 12 in. over 110,000 sq. m. The water obtained from A. W. naturally contains many mineral salts in solution, and so may be unsuitable for washing or certain manufs., but the general absence of organic impurities makes it valuable for drinking purposes. In some dists. of the Atlantic coast plain in the U.S.A., the development of artesian water supply has promoted a marked improvement in public health.

Many A. W. over 300 ft deep have been sunk in London. In the neighbourhood of Paris the borings are often much deeper. At Grenelle a well 1798 ft deep was sunk, the operations lasting from 1834 to 1841. In America many wells are over 2000 ft deep, and in Putnam Heights, Connecticut, there is one 6004 ft deep.

Artevelde, Jacob van (c. 1300-45), Flemish rebel, said to have been a brewer of Ghent, who became Governor of Flanders. During the revolt against Count Louis in 1337 he was chosen chief of the insurgents. He afterwards united with Edward III against the King of France and assisted at the siege of Tournai in 1340. In the truce which followed he stipulated the independence of Flanders, and became its governor. Later he offered the crown of Flanders to the Prince of Wales. He was massacred in a popular rising against his despotic rule at Ghent.

Artevelde, Philip van (c. 1340-82), Flemish rebel, son of Jacob van A. (q.v.), was chosen captain of people of Ghent in a revolt against Count Louis II in 1381. A. defeated Louis, took Bruges, and ruled quite independently. Louis, after obtaining assistance from France, entered Flanders with a Fr. army. He defeated the Flemings at the battle of Roosebeke and A. was killed.

Arth, vil. In the canton of Schwyz, Switzerland, at the S. end of Lake Zug. 17 m. E. of Luzern. It is a terminus of the Rigi railway, and stands on the site of the Goldau landslide of 1806.

Arthrectomy (Gk *arthron*, a joint; *ektomē*, a cutting out), excision of a joint.

Arthritis, inflammation of a joint. A. may occur as a result of infection via the blood stream with almost any bacterial organism, the commonest type perhaps being the streptococcal A. associated with

rheumatic fever (q.v.). *Gonococcal A.* can occur as a complication of gonorrhoea. *Tubercular A.* (see TUBERCULOSIS) is an all too frequent manifestation of bovine tuberculosis infection. *Septic A.* may result from the introduction of organisms into a joint from an injury such as a penetrating wound. Suppuration may be a feature of septic A. *Rheumatoid A.* is non-suppurative polyarthritis of unknown aetiology. The inflammation of the joints in rheumatoid A. is but one sign, albeit the most noticeable, of a generalised disease affecting the whole body. The essential pathological lesion of rheumatoid A. is a degeneration of what is known as the 'collagen' component of the fibrous connective tissues of the body, and this collagen degeneration is a feature common to all true rheumatic diseases. The disease may start at any age, but usually starts round about 40. It is estimated that 5 to 6 per cent of the population are affected. Females are affected three times as frequently as males. In children it is known as *Still's disease*. As a rule rheumatoid A. starts insidiously with general ill health, tiredness, anaemia, loss of weight, and painful stiffness. Occasionally the onset may be sudden, with a raised temperature and joint pains resembling an acute infective arthritis or rheumatic fever (q.v.). Following the stage of ill health the small joints of the hands and feet first become swollen and painful, then the larger joints become involved, sometimes even the spine. The pain and stiffness are more marked in the mornings and after rest, easing after movement. Muscle wasting and general loss of weight follow. The flexor muscles retain greater power than the extensor, and their pull, unless corrected, will give rise to flexion deformity of the joints. This, together with the swelling of the joints and the marked muscular wasting, gives the typical deformity so well known to those who have observed a severe case of rheumatoid A. The inflammatory process in rheumatoid A. starts in the synovial membrane of the affected joints and later spreads to the joint capsule, the adjoining tendons, and the joint cartilage. Fibrous tissue replaces normal tissue. The end result is a complete disorganisation of the joint and sometimes complete ankylosis (q.v.). The pain, particularly on attempted movement, is considerable. It is difficult to forecast the course of the disease. Remissions alternating with exacerbations occur, and for some reason pregnancy and jaundice inhibit its progress. About half of the total number of cases remain stationary for many years, and the activity of the disease becomes arrested. Other cases become progressively worse. The mode of onset gives no indication of the subsequent progress of a case. Treatment consists in rest and in preventing by splinting and other means the development of deformities. Physiotherapy plays a part in encouraging active, and performing passive, movements and generally maintaining muscle tone. Measures for building up the general and psychological condition of

the patient are essential. In a crippling and painful disease such as rheumatoid A., for which there is no known specific cure, it is natural that many treatments should have been tried and failed. Removal of teeth, tonsils, and surgical treatment of other possible foci of infection used to be widely practised in the belief that focal infection was a cause of the disease. This belief is no longer held. Gold injections, although not altogether without danger, have proved helpful in some cases, and their effectiveness has stood the test of time. But gold does not arrest the disease in every case. Simple aspirin or codeine tablets are most valuable in relieving pain, and in many cases aspirin also seems to have some specific curative effect. Hensch and his colleagues in the U.S.A. first demonstrated in 1949 the effects of cortisone and A.C.T.H. (adreno-corticotrophic hormone) on rheumatoid A. Patients given the hormone were at first relieved of their symptoms in a most remarkable way, and after a few days were able to move freely and without pain. It was thought that a cure had been found and that a diminished secretion of adrenal hormones was the causative factor in rheumatoid A. It was soon realised, however, that this was not the case. When cortisone is withdrawn, and even when it is continued, symptoms tend to return, and it is now known that it only suppresses temporarily the inflammatory condition of the joints, and does not cure the disease. A committee of the Medical Research Council reported in 1954 and 1955 on a comparative trial of aspirin and cortisone in two selected groups of cases. After two years' treatment neither group showed any marked improvement over the other. Nevertheless cortisone has proved of great benefit in relieving acute cases, and it is of great help to the patient's morale to be free for a time from distress. Cortisone therapy may also be valuable in tiding a patient over an exacerbation of the disease. The use of cortisone is contra-indicated in certain conditions such as heart failure, diabetes, high blood pressure, renal disease, and tuberculosis, and it must always be given with caution. More recently a drug called butazolidin has proved very effective in controlling the pain, and to some extent the inflammation, in rheumatoid A. It has its dangers, however, and must be taken under strict medical control.

Osteo-arthritis, degenerative disease of the joints. Osteo-A. affects mostly the larger joints such as the hips, knees, and shoulders. It may occur in more than one joint but is not widespread like rheumatoid A. It usually attacks people over middle age and the elderly. It is commoner in men than women. It seems to occur in those joints which during the course of life have been subjected to most strain and stress. In osteo-A. the cartilage of the joint degenerates and wears away, the corroded bone ends being left to grate one on the other. There is pain on movement and at night when the protective muscular spasm relaxes,

Treatment of osteo-A. is partly surgical, and operations have been designed for ankylosing the affected joint in a functional position, thus relieving the pain of movement. Drug therapy is similar to that for rheumatoid A.

See W. S. C. Copeman, 'Rheumatoid Arthritis,' *British Medical Journal*, 1952, 1, 1185; Report of the M.R.C. Committee, *British Medical Journal*, 1954, 1, 1223, and 1955, 2, 695.

Arthrodires, Devonian placoderm fishes in which the bony armour plates over the head on the one hand, and over part of the body on the other, were jointed together. They had bony jaws and a heterocercal tail. *Cicosteus* is a typical genus; *Dinichthys* is of gigantic size (about 30 ft long).

Arthropoda (Gk *arthron*, joint; *pous*, foot), invertebrate animals with jointed limbs, including insects, spiders, and crustaceans. They are segmented animals, bearing appendages on some of the segments, are bilaterally symmetrical, and covered with a firm chitinous cuticle. At least one pair of the appendages function as jaws. The perivisceral space mainly consists of an enlargement of the haemocoel. The phylum is divided into the Onychophora (*Peripatus*), Trilobita (extinct group), Crustacea, Myriapoda (millipedes and centipedes), Insecta, and Arachnida (spiders, mites, king-crabs, scorpions, etc.).

Arthur, usually described as a hero of mythological romance; but even if the exact historic existence of A. cannot be proved, at least some of the deeds ascribed to him can be traced to historical personages. The great authority for the authenticity of a historic A. is Nennius, but, as has been pointed out, Nennius lived at least 150 years after the deeds he describes, and no mention of A. can be found in contemporary writers. The historic battle of Mons Badon, as great a battle from the point of view of the Britons as the battle of Deorham is from the point of view of the Saxons, can at any rate be ascribed to Ambrosius Aurelianus. The battle is described by Gildas as taking place, as far as we can gather from his data, about the year 516. This great battle, which beat back the W. Saxons and prevented their further advance, is ascribed by Nennius to A. Since Gildas was a contemporary, whereas Nennius was not, and since the former gives the names of all important Brit. chieftains and omits that of A., we can safely conclude that A. was not a personage known to Gildas. On the other hand, Nennius gives the names of 12 great battles which A. fought, finishing up with the battle at Mons Badon. At this latter battle 960 men are given as having fallen to A.'s sword alone. In judging the authenticity of a historic A. we must bear in mind that A. is a fairly universal personage, but that all nations with which his name is closely identified are those of Brythonic origin. His name occurs in Gaelic hist. and in Welsh poetry, but of a very much later date than that to which the battle of Mons Badon belongs.

Nennius definitely gives us the places where these 12 battles were fought, but archaeologists still dispute the probable sites of the battles. The sites of some of them can be quite easily identified, as, for example, the ninth 'in Urbe Legionis,' i.e. Chester, and the twelfth at Mons Badon. In the eighth, which was fought 'in Casbello Guinon,' we are told that A. carried an image of the Blessed Virgin on his shoulders, 'and the heathen were put to flight on that day, and great slaughter made of them through the merits of Our Lord Jesus Christ and through the merits of the Blessed Virgin His mother.' Whatever truth there is, however, in the story of A. must be ascribed either to the details give by Nennius or to the data given by Gildas, since much that has been written of A. is obviously the invention of a later day, and the A. of Geoffrey of Monmouth is almost as impossible historically as is the creation of the mind of Tennyson. The romance of A. developed on the lines of medieval chivalry, and the A. of the tournaments cannot be compared with an A. fighting at Mons Badon, or, as one record describes him, beating back the armoured bands of the Romans on the Rom. walls. It remains now simply to trace the A. as we know him in his development by the romantic writers of later centuries. From the Ambrosius of Gildas to the Artorius of Nennius is a long step, and one in which the character and exploits of A. have not suffered. But from Nennius to Wm. of Malmesbury is a still longer step, and a step during which the character and exploits of A. are developed still more fully and become more and more painted in the light of a contemporary monarch. The A. of Gildas, if not also the A. of Nennius, must have been simply a Romanised Briton, who led his countrymen against the attacks of a common foe. But later A. becomes the centre of a picture of the ideals of chivalry and romance, the perfect knight, the perfect king, the perfect lover. We find the foundations of all Arthurian legend in Geoffrey of Monmouth and later developments in the stories of Sir Thomas Malory and Lord Tennyson. In later romance he has become the beau idéal of the true Christian knight—the knight who, accoutred in the armour of medievalism, goes forth to conquer wrong and free the oppressed. It has already been noted that the stories of our Prince A. are universal; the best-known story of how A. will come again is told by the Ger. peasantry as how Frederick Barbarossa will come again. The only conclusion that we can draw from so much contradictory evidence is that there may be a historical A. but he is certainly not the hero of romance that later ages have made him out to be. *Le Morte d'Arthur* (Malory); *Poems* (containing the 'Idylls of the King') (Tennyson); and *Two Morte d'Arthur Romances* are included in Everyman's Library. See also J. D. Bruce, *The Evolution of Arthurian Romance*, Göttingen and Baltimore, 1923-4.

Arthur, Duke or Count of Brittany (1187-1203), son and heir of Geoffrey,

third son of Henry II. His hereditary claim to the Eng. throne was therefore stronger than John's. The King of France used A. as a pawn in his campaign against Angevin power in France, and in 1202 John took A. prisoner at Mirebeau. A. d. at Rouen, probably murdered at John's instigation.

Arthur, Chester Alan (1830-86), the twenty-first president of the U.S.A., b. Fairfield, Vermont. He graduated from Union College in 1848; practised law in New York from 1853. Noted for his eloquence on behalf of the coloured people. At the time of the Civil war he was inspector-general and quarter-master-general for the state of New York. He was a Republican and held the office of collector of the port of New York (1871-1878). In 1880 he was elected vice-president, and in 1881 became president on Garfield's assassination, but was defeated for renomination by James G. Blaine in his candidature in 1884. His administration was marked by measures affecting the tariff, polygamy in Utah, the Chinese, the navy, and civil service reform. See *UNITED STATES, History*. See also biographies by Smalley, 1880, and G. P. Howe, 1934.

Arthur, Sir George, 3rd Baronet (1860-1946), soldier and biographer. Educ. at Eton and Oxford, he obtained a commission in the Life Guards and served in the Sudan 1884-5. In 1914 he was appointed private secretary to Lord Kitchener, and in 1920 pub. *The Life of Lord Kitchener of Khartoum*. Among his other works are lives of Sarah Bernhardt, 1923, Earl Haig, 1928, Queen Alexandra, 1934, Queen Mary, 1935, and King George V, 1937. He also ed. the letters of Lord and Lady Wolsley, 1922, and collaborated in a life of Lord Wolsley, 1924, and *The Story of the Household Cavalry*, 1909-26. *Not Worth Reading*, 1938, is an auto-biography.

Arthur, Timothy Shay (1809-85), Amer. author of moral and domestic tales, especially *Ten Nights in a Bar Room*, which had a great contemporary reputation. He founded *Arthur's Home Magazine* in 1852.

Arthur's Seat, hill to the E. of Edinburgh (q.v.), roughly in the form of a lion couchant, about 822 ft high. The ascent is easy, and a fine panorama can be seen from the top.

Artichoke. The true Globe A. is *Cynara scolymus*, native of N. Africa, herbaceous perennial, grown for its edible flower heads; the Jerusalem A. is *Helianthus tuberosus*, a N. Amer. plant of which the roots are edible. Both belong to the Compositae.

Article, Indefinite, see A.

The definite A. 'the' is allied to the Ger. *der* and the Dutch *de*. In Latin the definite and indefinite A.s do not exist.

Articles, Six, name given to a statute passed in 1539 at the instance of Henry VIII, who was alarmed at the increasing influence of the Eng. Protestants. These A. asserted the position of the Eng. Church on 6 fundamental Catholic doctrines, and were as follows: (1) belief in

transubstantiation; (2) communion in both kinds not necessary; (3) celibacy for the priesthood; (4) chastity to be observed when vowed; (5) private mass permitted; and (6) auricular confession necessary. The penalties for contravention of these A. were very severe, and refusal to believe in transubstantiation was punishable by burning alive. Death was also the penalty for a second offence against the other A. The A. were repealed in 1547, after Edward VI came to the throne.



ARTICHOKE

Articles, The Thirty-nine, see THIRTY-NINE ARTICLES.

Articles of Association, printed list of rules for the conduct of a joint-stock company. See COMPANY AND COMPANY LAW.

Articles of War were formerly ordinances issued by the king, or by the Commander-in-Chief with the king's authority, governing the conduct of a military campaign and ceasing on its conclusion. Until the passing of the first Mutiny Act (q.v.) in 1789 these were the only ordinances regulating the governance of troops, and in times of peace acts such as desertion or disobedience were only liable to the civil law, that is to say they were merely breaches of contract. The issuing of A. of W. was a prerogative of the Crown which was not taken away by the first Mutiny Act, but in 1803 it was superseded by statutory power to be found now in section 69 of the Army Act, 1881. This power to issue A. of W. is not now likely to be used, for the annually renewed Army Act or Mutiny Act covers the whole ground. Similar in every respect to those of the Army are the naval A. of W., and like them they are now embodied in a statute, the Naval Discipline Act.

Articulata (Lat. *articulare*, to join), an obsolete term applied by Cuvier to segmented animals, as the Crustacea, Myriapoda, Insecta, and Arachnida, now placed under the div. Arthropoda. He included the Annelida, which are not arthropods, and grouped the myriapods with insects.

Articulation. In the production of any sound the tongue is adjusted with relation to the palate at the place called 'place of A.' This is where the tongue has for that sound the maximum elevation. The common use of A. and this technical use are very often used too indiscriminately even by phoneticians.

In anatomy an A. is a junction, or joint, between the bones in the skeleton of a vertebrate animal. Such a joint may be immovable, when the bones are directly united (synarthrosis), as in the bones of the skull; or slightly movable, when they are connected by an intervening substance (amphiarthrosis or symphysis), as in the sacro-iliac joints; or more or less freely movable, when the articular surfaces are covered with smooth cartilage and surrounded by a fibrous capsule, lined with membrane, secreting a lubricating fluid called synovia (diarthrosis), as in the limb joints.

Articulator, telephone contrivance to produce smoothness of tone; also a moulder of bones for medical study.

Artificer Engineers, warrant rank in the Brit. Navy, open to engine-room artificers of not less than 8 years' service and over 35 years of age. A. E. are on a level with carpenters, and wear the same uniform, with a distinctive stripe of purple cloth on the cuff.

Artificers, Engine-room, rank of petty officers in the Brit. Navy. Candidates for this position must be not less than 21 nor more than 28, and have had some experience in either coppersmith's work, engine-fitting, boiler-making, or general smith's work. There are 4 classes of Engine-room A., the first or highest being reached after 12 years' service. A fifth class consists of boys over 15 in training.

Artificial Flowers, see FLOWER.

Artificial Limb, mechanical contrivance attached to the stump of an amputated limb and designed to perform the functions as far as possible of the natural limb. An early example, exhibited in the London Royal College of Surgeons, is said to have been made c. 300 BC. It is an artificial leg, made with pieces of thin bronze fastened to a wooden core; the foot, which has vanished, was probably made of wood. Another A. L. of historical interest is the hand of 'Götz of the Iron Hand,' with which he was able to grasp sword and spear.

The great improvement in methods of amputation in recent years has occasioned a corresponding improvement in designs for A. L.s. The surgeon aims at leaving a stump which will preserve the greatest possible length of limb, and which will bear the pressure consequent upon the use of an artificial substitute. In the arm the pressure of the appliance is greatest at right angles to the bone, so that the need for a considerable amount of padding over the end of the bone is not so great as in the case of the leg. The 'modified circular' method of amputation, which leaves the cicatrix over the end of the bone, is therefore suitable, as it can be carried out comparatively close to the injured or diseased part. Disarticulation

at the wrist-joint leaves a widened stump which is especially suitable for an artificial attachment. Amputation through the forearm, if it does not result in the fusion of the ends of the radius and ulna, leaves the power of pronation and supination, that is, of making the movements turning the palm upwards and downwards. Amputation through the upper arm naturally leaves a stiff-arm movement from the shoulder. A hand has been devised by which a certain amount of voluntary and variable movement is imparted to the thumb, by means of hydraulic power controlled by an india-rubber ball placed under the arm-pit.

The old method of screwing a hook into the stump of the arm has now been discarded for a spring or snap catch. The Mackay arm is a well-known modern pattern, and is made for high amputation at the shoulder and for amputation at the elbow; the hand is of rubber or wood and the remainder in light perforated metal. Since the First World War progress has been made in A. L.s, and to-day, with the assistance of harness (usually made of webbing), it is possible for some people to accomplish with their A. L.s almost as much as they could with their natural limbs. This advance is particularly noticeable in connection with artificial hands, for which a mechanism has been invented for grasping and releasing objects by control from the shoulder. Similar progress has also been made in an A. L. for the leg. An essential contributory factor to the success of an A. L. is the determination of the patient to overcome his disability. Aluminium is now extensively used in the construction of A. L.s because of its strength and lightness.

Artificial attachments to the lower limbs also depend upon the extent to which the functions of the limb are impaired. Amputation of a part of the foot leaves the ankle action unrestricted, and the skin incisions are so arranged that there is no cicatrix or skin-grafting in the part walked upon. It may be generally said that the availability for artificial attachments to the lower limb is best served by a 'dap' method of amputation, as the weight must be borne on the end of the bone, and such methods not only provide a sufficient 'cushion,' but can be arranged so that the cicatrix does not come in the line of greatest pressure. It was formerly the custom in amputating the lower leg to sever the tibia just below the knee, so that the artificial leg received the bent knee, the stump pointing backwards. The adoption of numerous devices in which the natural action of the ankle is imitated has now led to the preservation of as much of the natural limb as possible, because the extent of curtailment of a limb determines not only the extent of functional loss, but also the amount of leverage available; and consequently the amount of effort required to use an A. L.

Artificial Respiration, mechanical restoration of the act of breathing when it has been suspended by asphyxiation,

drowning, poisoning, etc. The aim of A. R. is not speed of movement but to obtain as deep a ventilation of the lungs as possible, so that air is put into the lungs and oxygen into the blood. The natural movements should be imitated as far as possible, and should be performed rhythmically 12 or more times per min. The method at one time adopted by the Royal Life-Saving Society and by the St John and British Red Cross organisations is called the 'prone pressure' or Schäfer method, and is described in the former body's handbook of instructions thus:

'The apparently drowned person must be placed at once, face downwards, on the nearest flat surface. Place yourself on one side of the patient, facing the head, in a full kneeling position, with knees and hip bent. Put your hands on the small of the patient's back, the wrists nearly touching, the thumbs as near each other as possible without strain and the fingers passing over the loins on either side, but not spread out. Then, bending the body from the knees and somewhat straightening the hip-joints, swing slowly forward, keeping the arms quite straight and rigid, so that the weight of your body is conveyed to your hands. No exertion is required; the necessary pressure is imparted by the weight of your body. In this way the patient's abdomen is pressed against the ground; the abdominal organs are forced against the diaphragm; the diaphragm rises and air is driven out of the lungs, together with any water or mucus which may be present in the air passages and mouth, thus producing expiration.

'Next, swing the body slowly backwards to its first position, thus removing its weight from the hands (which are kept in position) and relaxing the pressure on the abdomen. The organs now resume their former position, the diaphragm descends, the thorax is enlarged and air passed into the lungs, inspiration being produced. Repeat the movements regularly about 12 times a min., swinging the body alternately forwards and backwards from the knees.'

Another method is that of Sylvester. The patient is placed upon the back, the shoulders being slightly raised. The operator grasps the arms just above the elbows, and by raising them gently and steadily to their full extent behind the head induces inspiration. After 2 or 3 sec. they are lowered to the side of the chest and pressed against it, thus causing expiration. The movements, which should be supplemented by friction and preceded by an inversion of the body to drain off water, are often successful even after more than an hour's apparently unsuccessful work.

The most up-to-date method of A. R., and now adopted by the Royal Life-Saving Society and the St John and Brit. Red Cross organisations, is that of Holger Nielsen. The air pushed out by the Schäfer method in 1 cycle is about 500 c.c. The air pushed out and then pulled in by the Holger Nielsen method is over 1000 c.c. The oxygen saturation of the blood



THREE METHODS OF ARTIFICIAL RESPIRATION

Top, Sylvester (photos: Barbara Wagstaff); centre, Schäfer; bottom, Holger Nielsen (photos by courtesy of the St John Ambulance Association).

attained by the Holger Nielsen method is 93 per cent as against 67 per cent by the Schäfer. The technique of the Holger Nielsen method is as follows. The unconscious patient is placed flat on the ground face downwards. The arms are placed forwards on each side of the head and the elbows bent outwards so that the hands, lying palm downwards one on top of the other, are beneath the forehead. The position of the arms may be understood if the reader, while standing erect, first puts the back of his left hand flat and horizontally on the forehead, and then places the back of the right hand similarly,

but in this case resting on the palm of the left hand, which is already in position. In this way the patient's forehead is pillowed on the back of the uppermost hand, leaving the mouth and nose clear of the ground. False teeth and any foreign bodies obstructing the mouth or throat should be removed and the prone body slapped smartly between the shoulder-blades until the tongue falls forward. The operator then kneels on the right knee in line with the patient's head and facing towards his back, the operator's left leg being placed with the heel near the patient's right elbow. The

hands are then placed on the patient's shoulder-blades pointing towards his feet, with the thumbs on the spine and the wrists pressing against the ridges of the shoulder-blades. The operator should be nicely balanced with the arms straight but not actually pressing on the patient's back. A swing forward movement is then made until the straight arms are vertical and the operator is leaning on the body of the patient. This is the phase of forced expiration; it should last $2\frac{1}{2}$ sec. and it drives out the air and anything that may be blocking the air passages. Next the pressure is relaxed and the operator slides his hands along the patient's arms until the elbows are reached. This movement is done deliberately and should take 1 sec. The patient's arms and shoulders are then lifted upwards until the weight is felt, but not to the extent of raising the chest from the ground, nor must the position of the patient's head be disturbed. This lifting movement causes inspiration and should last $2\frac{1}{2}$ sec. The patient's elbows are then lowered again and the operator's hands are returned to the shoulder-blades. The whole cycle is then repeated. Each complete operation should take about 7 sec., or about 9 cycles to the min. It is to be noted that the number of cycles per min. is fewer in the Holger Nielsen method than in Schäfer's. In Schäfer's method pressure is applied to the abdominal contents to squeeze air out of the lungs, but nothing active is done to suck air in. In Holger Nielsen's method, however, the air is pushed out and sucked in, and it is therefore more efficient as a means of ventilating the lungs.

Another valuable method of A. It., and one which is far less exhausting to the operator, is Eve's rocking method. Here the patient is rocked to and fro lying face downward on an apparatus like a seesaw; when the head is down the abdominal contents press on the diaphragm and expel air from the lungs, and when the head goes up, and the feet are down, the abdominal organs fall away from the diaphragm and cause air to be sucked into the lungs. The tilt of the rocker should extend 45 degrees from the horizontal and the cycle should be carried out 10 times per min. An advantage of Eve's method is that it helps to re-establish circulation as well as respiration. Owing to the apparatus necessary, Eve's method is more suitable for use in factories and places where there is an equipped first-aid station. A makeshift rocker can be made, however, out of a stretcher or a wide piece of board placed astride a fulcrum, such as a fallen tree trunk. The patient must be tied firmly to the stretcher and care is needed to prevent it slipping off the fulcrum. A makeshift Eve's method therefore cannot be carried out by one operator, except for small children, who can be rocked in the arms. Nowadays many factory medical aid posts and mobile resuscitation units are equipped with apparatus for giving asphyxiated patients a mixture of oxygen and carbon dioxide gases at the same time as A. It. is

carried out. The CO_2 stimulates the respiratory centre in the brain (*see* RESPIRATION). A very recent form of apparatus is designed to force the gases into the lungs under positive pressure and then empty the lungs by a negative pressure phase, the positive-negative pressure phases alternating in regular cycles. The connection to the patient is made by means of an air-tight rubber face mask which fits over the nose and mouth. *See also* DROWNING and RESUSCITATION. *See* F. C. Eve, *Artificial Respiration Explained*, 1946; Royal Life-Saving Society, *Handbook of Instruction*; St John Ambulance Association, *First Aid to the Injured*.

Artificial Silk, *see* RAYON.

Artigas, Fernando José (c. 1755-1851), S. Amer. soldier and politician, b. Montevideo; became captain of a corps in the Sp. provincial service, but left this in 1811 for the Revolutionary army. Later he joined the Republican army, but was outlawed by the commander, Sarraatea, for independent action. He then organised a troop of gauchos, and was so successful that he was recognised as an independent chief and given the whole of Uruguay in 1814. He expelled the Portuguese from Montevideo and became dictator, but was ultimately defeated, and in 1820 fled to Paraguay, from where he was sent into exile in Candelaria.

Artillery (from O.F. *artillerie*; It. *artiglieria*; Sp. *artillería*). Its former meaning comprised all implements of war, and it was generally used in the plural. Then the word was used particularly to denote engines for discharging missiles, as catapults, bows, crossbows, and slings. In modern use the word denotes: (1) all firearms discharged from carriages in contradistinction to small arms; (2) the particular troops engaged in the service of such firearms; (3) the science which treats of the use and management of ordnance.

Early History. In the O.T. 'engines invented by cunning men to shoot arrows and great stones' are mentioned. Continual improvements were made, and under the names catapult, ballista, and trabuchet such arms were used in medieval warfare. A small piece of cannon was contrived by Schwartz, a Ger. cordelier, soon after the invention of gunpowder in 1330. But even on the discovery of gunpowder these weapons were not readily displaced. The first occasion on which guns were used was probably at the siege of Cividade in Italy, when the Germans employed one piece. It is also said that the Moors of Algeciras used A. in Spain in 1343. According to some historians guns were used at Crécy in 1346, when Edward III used 4 pieces of cannon. The English also used A. at the siege of Calais in 1347. The Venetians employed A. against the Genoese in 1377. At the siege of Harfleur (1415) 25 'master gunners' and 50 'servitour gunners' were employed. Gunners of that time had charge of all guns and stores, and laid and fired the cannon in action.

Sixteenth and Seventeenth Centuries. In

the wars of Charles VIII, Louis XII, and Francis I of France in Italy, A. played a conspicuous part in siege and field warfare, e.g. at Ravenna (1512) and Marignan (1515). Nevertheless when the arquebus and other small arms became efficient very little was heard of the field A. The efficiency of the Eng. archers denied opportunities for developing the arm in England. During Henry VIII's reign culverins were used as heavy pieces, and sakers and falcons as lighter pieces.

During the Eng. Civil War guns were in use. Cromwell in his sieges made great use of shells. Before his changes in the position of the A. the pieces were placed in the front of the force. He later relegated the heavy pieces to the rear.

Eighteenth and Nineteenth Centuries. Cromwell's policy was followed in the campaigns of Louis XIV. In the days of Turenne heavy guns were much employed. Marlborough also had about 9 pieces per 1000 men, and as he had an army of about 11,000 he used about 99 guns. The pike disappeared about 1700, and then infantry fire power became the decisive factor in battles. The Royal Regiment of A. was founded in 1717. In the year 1793 the Eng. force of A. had increased to 4000. For 4 cents. the word A. was strictly limited to mean garrison A. The field A. existed only in time of war. In 1793 horse A. was introduced, and a driver corps in the following year. Field brigades of 6 guns were then formed, horse-A. batteries being styled troops. A troop of horse A. and a field brigade each had 5 guns and 1 howitzer. The driver corps of 1794 was divided into troops. The addition of one of these to a company of foot A. converted the latter into a field brigade.

French Revolution and Napoleon. During the wars of the Fr. Revolution the A. of the field army received the name of the field A. The field guns were organised into batteries, each complete in itself. The Fr. A. steadily improved in manœuvring power during the Fr. wars. Napoleon himself maintained that the man who was clever enough to bring up an unexpected force of A. unknown to the enemy was sure to win the day.

After 1815 the hist. of A. becomes merely a matter of perfecting a material already discovered. Infantry fire being more variable in its effectiveness, the period 1815-70 saw many changes in the relations of the 2 arms. The introduction of the rifled musket demolished the A. manœuvres of the smooth-bore days. Up to this time A. forces depended very much on case-shot firing or firing their guns at close quarters. On the introduction of the new musket, infantry armed with a far-ranging rifle could keep the guns beyond case-shot firing and compel them to use only round shot or common shell. In the Amer. Civil War the attacking infantry on reaching close quarters met the full force of the defenders' A., together with the full force of the musketry. Battles began to be fought at increased ranges,

and the ineffectiveness of the projectiles used by the A. neutralised the effect of rifled guns. After the Franco-Ger. war many lessons were learnt and many changes were made in the use of A. New ideas on A. spread rapidly, and the quick-firing gun was soon introduced into every army. The original designs have been greatly improved, but the principles still remain. Improvements include the mechanical absorption of the recoil by means of buffers, and the development of time shrapnels as projectiles of the field A. Attention was next turned to the increase in rate of fire. A shield was then attached to the gun for the protection of the detachment. One result of the Boer War was to reintroduce heavy ordnance into field armies. Field howitzers also reappeared. At the latter part of the 19th cent. siege and fortress A. also underwent many great changes and developments. During the Franco-Ger. War of 1870-1 rifled guns 'long and short' for direct and curved fire were used as siege A. At present howitzers are the prin. siege guns.

Organisation, British Field Artillery. The basic Brit. A. unit is now the regiment made up of a number of batteries, together with a signal troop and a R.E.M.E. detachment. Each battery is divided into troops. The number of troops and batteries in a regiment varies according to the function of the regiment (e.g. anti-aircraft, etc.).

Horse Artillery differed from field A. in that the whole detachment was mounted, leaving guns and wagons free from the load of men. Only one horsed R.H.A. unit now survives—the King's Troop, which is employed solely for ceremonial purposes. With mt A. the whole equipment was carried on the backs of mules and other animals.

Development in the First World War. Four years of scientific warfare in the First World War saw a consistent development in the power and influence of A., both in the actual battle and in all the stages which lead up to it.

Ever-increasing demands for guns were made in the first 2 years of the war. The only modern heavy howitzer available to the Brit. Army in 1914 was the 9.2-in. Mark I howitzer. When in 1916 Gen. Haig was calling for more guns, he selected the latest 'Marks' of existing models in order to facilitate construction and ensure uniformity in design. At the same time the Commander-in-Chief insisted that every effort should be made to increase the range and accuracy of guns, and that there should be no cessation of research and no finality of design.

The main principle on which the construction programme was based was to give a decisive fighting superiority per div. over the Ger. A. There was a preference for the howitzer over the gun. Its 'life' is greater, e.g. for a 6-in. gun, Mark VII, the 'life' is 1500 rounds, for a 6-in. howitzer, 10,000 rounds. The howitzer, too, is much easier to place in position in the field, and many can be sited in a comparatively restricted

area, owing to the higher line of departure of the shell. Though they have less range than guns of a similar shell-power, howitzers are more mobile and, fired at horizontal ranges, their accuracy is greater.

In 1914 there were in the original Brit. expeditionary force 486 guns and howitzers, 24 of which were of medium calibre; at the armistice there were 6437 guns and howitzers of all kinds (excluding anti-aircraft A. and trench mortars), of which 2211 were medium and heavy A. The Ger. A. comprised only a few howitzers of 16½-in. calibre. The Fr. field gun was the famous 75-mm. quick-firing gun, with the recoil controlled by compressed air.

The later technical improvements in Brit. A. design included long-range, modern 6-in., 8-in., 9.2-in., and 12-in. howitzers, 6-in. Mark XIX guns on field carriages, and 9.2 in., 12-in., and 14-in. Mark XIII guns on railway mountings. Other improvements were instantaneous fuses, gas and smoke shells, stream-line shells, and incendiary and star shells.

Second World War Developments. The Second World War saw a great development of anti-aircraft and tank guns. Also various types of self-propelled guns were used for assault or close support. One type was a 75-mm. mounted on a light tank chassis, and another a 150-mm. on a medium tank chassis. The advantage of these was that A. accompanied tanks and could fire straight away. The type was first used in the big battle for Libya (1941-2).

The improved Ger. 88-mm. gun was probably the best 3-purpose gun (i.e. anti-tank, anti-aircraft, and field A. piece) developed during the war. Many new types of A., including very large mortars and long-range field guns, were under development or construction in Germany in the closing stages of the war. Some of them had rocket-assisted shells. Among these were a 380-mm. howitzer and rocket 'guns' with smooth-bore barrels, 400 ft long, intended for the bombardment of London. A new 120-mm. anti-tank gun was likewise in development. The Germans were also working on a 32-in. siege gun, with a barrel 141 ft long, which fired an 8-ton projectile. In the last months of the war in the Far E. the Japanese also introduced some heavy mortars and heavy rockets. Amer. recoil-less guns were another notable development.

Post 1945 Developments. The successful employment of the rocket in the latter part of the Second World War has led to the increasing manuf. of this weapon in preference to conventional forms of A. Coast A. has already been discarded in Great Britain, and the organisation responsible for its administration has been disbanded.

In the Amer. and other armies atomic cannon have now been introduced. Details of developments in this field are described in F. O. Miksche's *Atomic Weapons and Armies*, 1955. Miksche estimates that certain of these cannon have a destructive power equal to 5000

conventional guns. See **ROYAL REGIMENT.** See also Col. H. Betnell, *Modern Guns and Gunnery*, 1910; Lt.-Col. H. W. Hime, *The Origin of Artillery*, 1915; W. Ley, *Shells and Shooting*, 1942; Lt. A. W. Wilson, *The Story of the Gun*, 1944; Maj.-Gen. Y. F. C. Fuller, *Armament and History*, 1946.

Artiodactyla (Gk *artos*, pair; *dactulos*, finger), order of cloven-hoofed mammals, all excepting the pigs and hippos having molar teeth with broad crowns suitable for crushing vegetable food. The order comprises the following groups: (1) *Pecora*, including giraffe, okapi, deer, oxen, sheep, goats, antelopes, etc., characterised by horns or antlers, 2 or 4 teats, 4 cavities in the stomach, and no upper incisors; (2) *Tylopoda*, including camels and llamas, characterised by absence of horns, few teats, 1 pair of upper incisors, and a cushion-like pad on the foot to bear the weight of the body; (3) *Tragulina*, the chevrotians, or mouse-deer, characterised by absence of horns, no upper incisors, 4 complete toes on each foot, and 3 stomach cavities; (4) *Anoplotherina*, comprising extinct species with complete series of teeth and a general resemblance to carnivorous animals; and (5) *Suina*, or pigs, including Old World pigs, Amer. peccaries, and hippopotamus, and characterised by at least 1 pair of upper incisors, the cheek-teeth prominent and studded with tubercles.

Artists' Rifles, formed in 1869 as a volunteer corps by Lord Leighton and other professional men. In 1908 it became part of the National Territorial Army as the 28th Batt. of the Co. of London Regiment (Artists' Rifles). In 1947 it became the 21st Special Air Service Regiment (Artists' Rifles) Territorial Army.

Artocarpus, genus of the Moraceae which grows in Asia. *A. incisus* is the bread-fruit tree common to the S. Sea Is.; it has a spurious fruit called a *sorosis* (cf. pineapple), which is roasted and eaten as bread. *A. integrifolius*, the Jack tree, has a prickly fruit which is not so wholesome as that of *A. incisus*. *A. hirsutus* makes good timber.

Artois (Lat. *Artesium*), anct Fr. prov., comprised of the greater part of the present dept of Pas-de-Calais. The cap. was Arras. It was made a co. by Louis IX in 1237, passed into the hands of Burgundy, and afterwards belonged to the Hapsburgs. It was ceded to France by the Peace of the Pyrenees (q.v.) in 1659. Louis XV created his grandson, the future Charles X, Count of A. The first artesian well in Europe was sunk in 1126 in A., from which the word 'artesian' is derived.

Artois, in the First World War. The first heavy fighting in the A. region was in 1915, when the French and British in co-operation delivered a general attack, beginning on 25 Sept., a few in. to the N. of Arras. The opening stages of the A. advance were crowned with success. Fr. troops under d'Urbal took Souchez and the foot of the famous ridge overlooking the little town of Vimy, while the forces of Sir John French carried the enemy's first and most powerful line of entrenchments,

extending from W. of the mining tn of Lens to a point near the notorious Hohenzollern redoubt, covering a front of some 4 m. Loos fell to the British, who pressed on to the outskirts of Hulluch near La Bassée. On the reduction of the Ger. second line the dominating position known as Hill 70, beyond and to the E. of Loos, was captured, and a position rapidly consolidated whence it was hoped soon to overcome the third and last line of the enemy. Considerable success had, at the same time, attended the simultaneous Fr. onslaught in the Champagne; but thereafter the allied attacks lost their impetus. It was soon realised in England that some much greater effort in the production of material would be required before any further attempt on a big scale could be made with a reasonable hope of success. (See also ARRAS, BATTLE OF and LOOS, BATTLE OF.)

In 1916 the Germans delivered a local attack on Vimy Ridge in May, but the battle of that name was fought between 9 and 11 April 1917, when Canadian troops were conspicuous in the attack. In the same year was fought the battle of Hill 70, between 15 and 25 Aug., in the Souchez R. dist. from Lens to Angres. In 1918 there were heavy engagements in the course of the second battle of Arras (Aug. to Oct.) during the successful operations for the breaking of the Hindenburg line. In the final advance the last fighting in A. was approximately on 17 Oct., when Douai fell to the Allies.

Artophorion (Gk 'bread-holder'), ciborium or pyx (q.v.), used in the Gk Church. See Neale, *History of the Holy Eastern Church*, 1850.

Artôt, Desirée (1835-1907), Belgian singer. She first sang at concerts at Brussels, and then, on the recommendation of Meyerbeer, she went to Paris, and made her début in *The Prophet* in 1858. She afterwards went to Italy and to Berlin, where she took part in Ger. and It. operas. In 1868, during a visit to Russia, she became engaged to Tchaikovsky, but the next year she married Padilla, the Sp. singer.

Arts, Degrees in, see DEGREES.

Arts, Fine, see FINE ARTS.

Arts Council of Great Britain, set up under royal charter on 9 Aug. 1946 to develop a greater knowledge, understanding, and practice of the arts, to increase their accessibility to the public, to improve their standard of execution, and to advise and co-operate with gov. depts, local authorities, and other bodies on any matters connected with these objects. It was the successor to the Council for the Encouragement of Music and the Arts (C.E.M.A.), which was created in 1940 to serve the artistic needs of the public in war-time. The A. C. consists of not more than 16 members, who are appointed by the Chancellor of the Exchequer after consultation with the Minister of Education and the secretary of state for Scotland. It receives an ann. grant-in-aid from the Treasury, the greater part of which is passed on in the form of subsidies to independent bodies connected

with the promotion and performance of the arts in Great Britain. The work in England comes directly under the control of the A. C. itself; but there are separate committees for Scotland and Wales, which are in receipt of ann. grants from the council for the purpose of carrying out the council's work in those two parts of the country. There are four panels of experts in music, drama, the visual arts, and poetry, who advise the council on such matters as are referred to them. The council's H.Q. are at 4 St James's Square, London, SW1.

Artveldt, Andries van (1590-1652), Flem. painter, who worked for sev. years at Genoa. His pictures were mostly landscapes and seascapes. His portrait was painted by Van Dyck.

Artz, David Adolf Constant (1837-90), Dutch genre painter, inspired largely by Josef Israels (q.v.). Among his characteristically realist paintings are 'With Grandmother,' 'The Old Fisherman,' 'In the Dunes,' and 'The Return of the Flock.'

Aru, or Aroe, is. group in the S. Moluccas, in the Arafura Sea, Indonesia. The total area is 3306 sq. m., and the chief tn is Dobo. They are generally fertile with swampy coastal areas, pearl fishing, and trepang. The natives are of mixed Papuan-Malayan stock.

Aruba Island, one of the Dutch Antilles, near coast of Venezuela, now a great centre of oil refining. Area 67 sq. m. Chief tn Oranjestad. Pop. 55,000.

Arum, family Araceae, genus of European and Mediterranean tuberous herbs, distinctive for their large spathe and club-shaped spadix. *A. maculatum*, Lords and Ladies, Cuckoo Pint, is native to Britain; *A. dioscoridis* is a popular water garden plant.

Arumi, see MORON DE LA FRONTERA.

Arun, River, rises in St Leonard's Forest, flows W. and then S. through Sussex, past Arundel to Littlehampton on the coast. It is 40 m. long, and is navigable for a part of its course.

Arunda, see RONDA.

Arundel, Thomas (1353-1414), Archbishop of Canterbury, son of the Earl of A. A. was made Bishop of Ely in 1374, and lord chancellor 12 years later. He became Archbishop of York in 1388 and Archbishop of Canterbury, 1396. In the next year he was banished for high treason. He supported Bolingbroke, and when the latter returned to England A. returned with him, and crowned him Henry IV. A. is best remembered for his persecution of the Lollards (q.v.). With Courtenay (q.v.) he helped to suppress Lollardy at Oxford. He was also responsible for some splendid building at Canterbury and Ely.

Arundel, municipal bor. of Sussex, England, on R. Arun, 10½ m. E. of Chichester. The tn is dominated by A. Castle, ancestral home of the Duke of Norfolk as Earl of A. (see next article). Though of 12th-cent. and earlier foundation, the castle now consists mainly of 19th-cent. buildings, in the medieval style. The modern Rom. Catholic church of St

Philip Neri, another fine example of 19th-cent. Gothic, is a prominent landmark. Pop. 2650.

Arundel, Earls of. The earldom of A. has been held chiefly by the Fitzalans and their descendants the Howards.

Richard Fitzalan (1267-1302), Earl of A., son of John, Lord of A. (1246-72). Richard was called Earl of A. c. 1289. He fought for Edward I in France and Scotland.

Edmund, successor of Richard (1285-1326). He was an enemy of Piers Gaveston and declined to march with Edward II to Bannockburn. In 1321 he became connected with the Despensers and sided with the king. He was executed at Hereford by partisans of Queen Isabella.

Richard, son of Edmund (c. 1307-76), soldier and faithful servant of Edward III. He was present at Sluys and siege of Tournai, 1340. He led an Eng. div. at Crécy, and was present at the siege of Calais. He inherited estates of his uncle John, Earl de Warenne, and assumed the title of Earl of Surrey. Regent of England, 1355.

Henry Fitzalan, 12th Earl of A. (c. 1317-80), son of Wm., 11th Earl of A. He was made lord-deputy of Calais, 1532, and in 1544 commanded an Eng. expedition to France and took Boulogne. On returning to England he was made lord chamberlain. He was imprisoned in the Tower in 1551 for being implicated in Somerset's plot against Northumberland. On Edward's death Henry joined Northumberland, though secretly in alliance with Mary. In Northumberland's absence he denounced him and proclaimed Mary as queen. Elizabeth I made him a privy councillor and lord steward, but he was soon suspected of intriguing to set Mary Queen of Scots on the throne, and fell from favour. He was imprisoned after the exposure of the Ridolfi plot but escaped execution.

Arundel Marbles, or *Marmora Arundelliana*, major portion of an important Gk chronicle discovered on the is. of Paros (hence known as *Marmor parium*). The author tells at the beginning of this chronicle that he intends to list the main events of Athens from the period of Cecrops (a mythical King of Athens, attributed to c. 1581 bc) down to 264-263 bc (probably his own time). The A. M. contain 93 lines (with several lacunae); they were brought to England in 1627 on behalf of Thomas Howard, Earl of Arundel, and were pub. the following year by John Seldon (*Monumenta Arundelliana*, London, 1628). A smaller fragment of 33 lines, dealing with the years 336-335 to 299-298, was discovered in 1897 and pub. by M. K. Krispien and A. Wilhelm in *Athenische Mittheilungen*, XXII, 1897, pp. 183 ff.

Arundo, genus of plants of the Gramineae which grows in Europe, Asia, and Africa. *A. donax* is our largest cultivated grass, which grows to 10 ft in height; the stems are made into fishing-rods. *A. phragmites*, or *Phragmites communis*, is the common reed.

Aruspex, see HARUSPICES.

Aruwimi, trib. of the Congo. It was explored by Stanley for 100 m. in 1883, and by its means Stanley advanced to help Emin Pasha in 1887. It has its source near Lake Albert (Nyanza) and is formed by many sub-tribes. The main riv. flows for most of its length through the great equatorial forest, and in its densest part. It joins the Congo in lat. 1° 12' N., 28° 38' E. and is navigable for nearly 100 miles as far as the Yambuya rapids.

Arvad, or **Aradus** (Jezireh Ruad), anct Phoenician city. It occupies a very small is., 2 m. from the coast, near the mouth of the R. Eleutherus (Nahrel Kebir). It is said to have been founded by Sidonians. The inhab. were skilled navigators.

Arval Brethren (*Frates Arvales*), college of 12 priests in Rome, who made yearly offerings to the field Lares for increase in the fruits. Romulus was claimed as their founder. Niebuhr suggested that this college was originally connected with the Lat. element of the Rom. state. The sister college was the *Sodales Tituli*. The badge of office, which was lifelong, was a chaplet of ears of corn worn with a white band. The prin. festival lasted for 3 days in May, in honour of Dea Dia, who is supposed to be Ceres, and an account of the festival is preserved in an inscription from the first year of the Emperor Elagabalus, AD 218. Considerable fragments of the A. B.'s records have survived.

Arve, riv. of France and Switzerland: rising in the Col de Balme (q.v.) it flows through the vale of Chamonix, and joins the Rhône near Geneva. Length 62 m.

Arverni, anct Gallic tribe in the Auvergne Mts in France (the name Auvergne derives from A.). They offered a stubborn resistance to the Romans, but were finally crushed, 52 bc, and subsequently adopted Rom. civilisation quite readily.

Arvers, **Alexis Félix** (1806-50), Fr. poet and dramatic writer, b. Paris. His first work was entitled *Mes heures perdues*, 1833, a collection of poems, which earned for him the reputation of a poet. His dramatic works consisted of *En attendant*, with Bayard and P. Foucher, 1835; *Les Deux Maîtresses*, with Scribe, 1836; *Les Dames patronnesses*, with Scribe, 1837; *Rose et Blanche*, 1837; *Les Anglais en voyage*, 1844; *Suzon et Suzanne*, 1850. His sonnet to Marie Nodier, *Mon âme a son secret*, has remained famous.

Arveyron, trib. of the Arve (q.v.). It is an outlet of the Mer de Glace in Chamonix valley. It issues thence through a wonderful grotto of ice, known as the Ice Gates of A. The course is short.

Arvida, the aluminium city in Quebec, Canada, 5 m. E. of Chicoutimi. Founded in 1927 by the Aluminum Co. of Canada; the company's plants cover a sq. m. and are the means of livelihood of practically the entire pop. of the city. Pop. 12,800.

Arya Samaj, reformist Hindu society founded by Dayananda Sarasvati (d. 1882) which rejects idolatry and seeks to

bring India back to the pure Vedic path. It became mainly a political body, aiming at the self-gov. of India, and determined to drive out the foreigner, and it has at times been a rather militant opponent of the proselytising activities of non-Hindu faiths.

Aryabhata (b. c. AD 467), Hindu mathematician and astronomer, was one of the pioneers of the development of algebra and trigonometry; b. at Patalliputra (Patna), he wrote a book on astronomy at the age of 23, but his chief claim to immortality is in his working out of rules for summing up series of natural numbers and of the powers of natural numbers, in his calculation of the sine ratios of angles at intervals of $3\frac{1}{2}$ degrees and in working out the value of π at 3.1416. He discusses the rules of arithmetic and the rules of signs of Diophantus of Alexandria, fundamental to the study and use of directed numbers.

Aryan, or **Arian**, derives from Sanskrit *ārya*, originally a national name indicating the Brahmins, and later meaning 'of noble, of good family,' from Old Persian *ariya* and Middle Persian *ariya*, with similar meanings; and from Gk *Ἀρία*, Lat. *Arīa* or *Arīa* and *Ariana*, indicating E. Persia, nowadays 'Iran,' the name of Persia. The term A., or rather Indo-A., is now generally applied to the Indo-Iranian group of the Indo-European family of languages (see INDO-EUROPEAN).

A new connotation was lent to the term A. by the so-called A. Paragraph, under which in Germany before the Second World War full rights were granted only to 'A.s,' or persons who could trace their 'A.' descent back for at least a period of 100 years. The aim of this policy was anti-Semitic and the policy was a cardinal feature of Hitler's conception of a Third Reich comprising only the pure 'Nordic' peoples of W., Central, and E. Europe. At the time of its introduction there were estimated to be 600,000 Jews in Germany, and such a policy necessarily required some ethnological justification for the persecution of so large a body of Ger. citizens, including many of world distinction. The hypothesis of the Ger. people being the leading representatives of the Nordic 'A.' race was taken from the teaching of Gobineau (q.v.) as developed by Houston Stewart Chamberlain (q.v.), the renegade Englishman, von Ranke, Lapouge, and others. Gobineau tried to explain hist. as an eternal conflict between the long-headed or dolichocephalic and the broad or short-headed or brachycephalic races, and at the apex of the world's races he placed the big blond dolichocephalic or 'A.' race; while the later writers went still farther, and relegated the Jews or Semitic 'races' to the Mulatto class. But hist. would seem to show that all the 'progressive' races are composed of the same 3 stocks—Nordic, Alpine, and Mediterranean—and, if this be true, the political edifice founded on race prejudice must collapse. The term A., too, can only be applied to speech, and Nordic, which indicates a breed, can only be applied to

race. The Jews, like the Germans, were of 2 different races: if they came from Poland they apparently (at least in great part) were of the Alpine stock; if from Spain, they may have been of the Mediterranean race to which the Jews of Palestine itself may have belonged, when not of the Armenoid race; and, broadly speaking, the term Jew should be mainly employed in connection with religion. Most of the European Jews are really of Alpine stock, and brachycephalic, like the rest of the mid-European peoples; and Ger. Jews, racially, were Alpines, like the S. Germans. Consult Julian Huxley, A. C. Haddon, and A. M. Carr-Saunders, *We Europeans*, 1935.

Arzamas: 1. Oblast in Central Russia, E. of Moscow, situated in the Volga uplands, and covered by wooded steppe. It has small iron ore deposits. Area 10,500 sq. m.; pop. (1956) 1,068,000, mostly Russian (until 17th cent. predominantly Mordva, q.v.). A. has high-grade steel production, wheat and hemp growing, poultry (A. geese), and old home industries. The prin. tns are Arzamas, Kulebaki, Vyksa.

2. Cap. and cultural centre of the above, 53 m. S. of Gor'kiy. It has flour mills and tanneries. It was founded in 1578, absorbing an anc. settlement of the Mordva. From 1802 to 1862 it had a school of painting, the first prov. school of its kind in modern Russia. Pop (1956) 39,000.

Arzano, It. tn, in Campania (q.v.), 3 m. N. of Naples (q.v.). It has some beautiful villas. Pop. 10,000.

Arzerum, see ERZERUM.

Arzeu, Algerian seaport between Oran and Mostaganem. Has exports of salt and esparto grass. Near A. are the Kleber marble quarries, and the remains of the anc. tn of Arsenaria. Pop. 7700.

As (Ger. *Asch*), Czechoslovak tn in the region of Karlovy Vary (q.v.), near the Ger. border. Manufs. include textiles, beer, and musical instruments. Pop. 11,500.



ROMAN AS

Obverse, two-faced head of Janus;
Reverse, prow of ship.

As. This Rom. term had a threefold meaning—unity in 3 senses. It denoted (1) a weight of 12 oz, equivalent to the *libra* or Rom. pound; (2) a copper coin, varying in weight at different periods from 12 oz to less than half an oz; (3) a measure equivalent to a linear ft or sq. ac.

Asa (913–873 BC), 3rd King of Judah, succeeded his father Abijah. He adopted

stringent measures against idolatry. He was a successful warrior, repulsing the Egyptians, and in alliance with Benhadad, King of Syria, defeating Baasha, the Israelite king. See 1 Kings xv; 2 Chron. xiv-xvi.

Asa Dulcis, synonym of benzoin, is a drug made from the balsamic resin of *Styrax benzoin*, a plant of the family Umbelliferae. It has a soothing effect when locally applied in cases of inflammation or abrasions of the skin.

Asachi, Gheorghe (1788-1869), Moldavian author. His importance in the Rumanian cultural revival depends on his work as educator, reorganiser of Moldavian schools, founder of academies and an art school, translator, initiator of the Moldavian theatre, journalist (he founded the first Moldavian periodical, and many others), diplomat, and statesman.

Asafoetida, gum resin obtained from the root of *Ferula foetida*. The active principle is an ethereal oil, allyl sulphide. It acts as a stimulating expectorant, and has been used in bronchial affections. It was at one time used in nervous and hysterical ailments, possibly controlling the erratic nervous phenomena by the psychological influence of its disgusting smell.

Asam, name of a family of Ger. artists, the prin. members of which were: (1) Hans Georg (d. 1696), whose work consisted of frescoes and oil-paintings. (2) Cosmo Damian (c. 1686-1742), a painter, and Aegidius Quirinus (d. 1746), a sculptor, both sons of Hans Georg. They worked together at the churches of Innsbruck, Munich, Schleissheim, and Mannheim. (3) Cosmo Damian's 2 sons, Franz Erasmus (1720-94) and Engelbrecht, both painters.

Asaph, musician under David and Solomon (1 Chron. xvi. 5), and chief of the Levites appointed by David to minister before the ark with praise and thanksgiving (1 Chron. xxv. 1). A. is regarded as the founder of the 'Sons of A.', a guild of singers in the second temple (Neh. vii. 44). Psalms l and lxxii-lxxxiii bear his name.

Asaph, St (d. c. 600), Welsh ecclesiastic. He became head of a monastery at the confluence of the R.s Clwyd and Elwy, succeeding St Kentigern. It is most probable that he was the first bishop of the see of Llanelwly, which was afterwards known as St A. His feast is on 1 May.

Asaph, St, Welsh tn, see ST ASAPH.

Asar, or Oesar, Swedish name for the long, winding ridges of gravel and sand found in the low-lying parts of Sweden. These ridges sometimes extend for more than 100 m., one main ridge being joined by many trib. ridges. The appearance that these give to a riv. delta has given rise to the belief that the deposits were formed by streams underneath the ice-sheets which covered Sweden during the Glacial Period, and that the direction of the ridges may mark the site of sub-glacial rivs. Similar ridges of gravel and sand are found in Ireland, where they are called eskers, and in Scotland, where the name kames is given to them, and in the N.

states of N. America. Also a Persian gold coin formerly worth about 6s. 8d.

Asarabacca, Eng. name of *Asarum europaeum*, a perennial herb of Europe, rarely native in Brit. woods, at one time grown as a medicinal plant, its leaves being used as snuff.

Asarin, or Asarone, preparation from the plant *Asarum europaeum*, smelling like camphor.

Asben, see AIR.

Asbestos (Gk. 'unquenchable'), name applied to varieties of fibrous minerals of the serpentine and hornblende groups. A. has great resistance to heat and chemical attack and can be woven into cloth; in this form it was used by the ancients to enclose dead bodies so that when placed on the funeral pyre the ashes could be retained. The varieties used in manuf. are principally chrysotile, a form of serpentine, and crocidolite and amosite, which are amphiboles of the hornblende series. Chrysotile, the most important commercial fibre, has a greenish lustre in the massive form, but when broken down to fibres assumes a whitish colour and is commonly called 'white' A.; the prin. workings of chrysotile are in the Quebec prov. of Canada, S. Rhodesia, and Russia, although lesser deposits are widely distributed. Amosite and crocidolite ('blue' A.) are mined in the Union of S. Africa. Raw A. is first crushed in special mills to break down the rock, and after screening is further fiberised so that it may be processed on textile machinery to produce yarns or cloths, or compounded with rubber, cement, or synthetic resins to produce many important industrial products. A. has high resistance to heat, is a poor conductor of electricity, and is unaffected by most corrosive chemicals. Crocidolite has particularly good acid resistance.

A.-based materials are widely used for the sealing of glands and joints in steam and industrial plant and machinery of all kinds and for the thermal insulation of pipework and boilers. A.-cement sheets are used for the roofs and walls of industrial buildings. A. cloths are used for firemen's suits, theatre safety curtains, and filtration purposes. A. tapes and tubes are used for the insulation of electrical machinery. A. reinforced plastics are used for structural parts of aircraft and electrical and mechanical plant.

PRODUCTION

	Chrysotile (1952)	approx.
Canada	877,000	metric tons
S. Rhodesia	77,000	" "
United States	47,000	" "
Swaziland	32,000	" "
Crocidolite (1951)		
S. Africa	30,000	" "
Amosite (1951)		
S. Africa	49,000	" "

Asbjörnsen, Peter Christen (1812-85). Norwegian writer and folklorist. After studying at the univ. of his native city, Christiania (now Oslo), he served for some

years as a country tutor, giving much time to the study of the poetry and folklore of the peasantry. He subsequently returned to Christiania, where he studied medicine and science. From 1846 to 1853 he was engaged by the Norwegian Gov. in scientific work on the coast. Later he became a gov. inspector of forests. In addition to sev. handbooks and memoirs on scientific and practical subjects he wrote in collaboration with his lifelong friend, Jörgen Ingebrektsen Moe, the collection of Norwegian fairy-tales which appeared under the title of *Norske Folkeeventyr* (1st series, 1842; 2nd series, 1844; 3rd series, 1871). In 1845 he pub. alone the first book of the *Norske Huldreeventyr og Folkesagn*. In these delightfully written classics may be traced much of the modern national spirit in Norwegian literature. They have been trans. into English in Dasent's *Popular Tales from the Norse*, 1859 (new ed. 1903), and *Tales from the Field*, 1874; also Brackstad's *Round the Yule Log*, 1881. See K. Liestøl, P. C. Asbjörnson, *Mannen og liesverket*, 1947.

Asbjörnsson, Jón (1890-), lawyer and scholar, judge in the Supreme Court of Iceland, founder (1928) and president of the Icelandic Old Text Society, which is doing extremely valuable work, bringing out improved eds. of the Old Icelandic classics.

Asbury, Francis (1745-1816), first Methodist bishop of the U.S.A., b. Hands-worth, England; sent to America in 1771 as Wesleyan missionary, in which capacity he showed untiring zeal and energy. He d. at Richmond, Virginia. See his *Journal* (3 vols.), 1821, and Strickland's *Pioneer Bishop*, 1858.

Asbury Park, city of Monmouth co., New Jersey, U.S.A., 6 m. S. of Long Branch. It is a favourite resort area. It manufs. clothing, electrical products, and confectionery; it has a seafood industry and there are fruit and truck farms. Pop. 17,090.

Ascalon (modern **Ashkelon**), Israel, on the Mediterranean, 40 m. SW. of Jerusalem, one of the 5 chief cities of the Philistines, and the seat of the worship of the Syrian goddess Derceto. It was the bp. of Herod the Great, who did much to beautify it. During the crusades it suffered many vicissitudes. In 1099 the Christians gained a victory outside its walls. In 1153 it was captured from the caliphs by Baldwin III, King of Jerusalem. Captured by Saladin in 1187, it later fell into the hands of Richard Cœur de Lion. Its fortifications were finally destroyed by the Sultan Baibars in 1270. From A. is derived the name of the eschalot or shallot, a kind of onion originally grown in the surrounding country.

Ascania, name of a Ger. dynasty founded in the 12th cent. by Albert the Bear, first margrave of Brandenburg (q.v.), whose castle, near Aechersleben (q.v.), bore this name. This ruling house was closely connected with that of Anhalt (q.v.).

Ascanius, or **Iulus**, legendary son of Aeneas and ancestor of the Julii. He

accompanied his father to Italy from Troy, and later founded Alba Longa.

Ascaris (Gk *askris*), a kind of worm, a genus of thread-worms, or Nematoda, which includes sev. intestinal parasites, sometimes of considerable size. *A. lumbricoides*, the ringworm found in man, may attain 14 in. in length; *A. megalocephala*, found in horses and cattle, 17 in. *A. mystax* occurs in dogs and cats.

Ascasubi, Colonel Don Hilario (1807-75), Sp.-Amer. poet, b. Buenos Aires. He took an active part in the contests against Quiroga and Rosas, and realised his political ambitions by the separation of the confederated provs. His studies of the lives of the gauchos bore fruit in his poetical romances of the pampas. In 1864 he attended the Confederation of Paris as Argentine ambas.

Ascendant, see ASTROLOGY.

Ascension, Brit. is. of volcanic origin, situated in the S Atlantic, lat. 7° 56' S. and long. 14° 22' W., 760 m. NW. of St Helena, 7½ m. long by 6 broad, with an area of 34 sq. m. The is. derives its name from the fact of its having been discovered on Ascension Day, 1501, by the Portuguese navigator, Juan de Nova. It was occupied by the British in 1815 in connection with the captivity of Napoleon at St Helena, and until 1922 it was under the supervision of the Admiralty, who maintained a small naval station there. In Sept. 1922 it was made a dependency of St Helena and placed under the control of the Colonial Office. A barren, rocky peak, it has no vegetation, except at the highest elevation, but has been cultivated to an extent permitting the maintenance of 300 sheep and the growth of shrubs and various vegetables. The climate is very healthy. There is a sanatorium at Green Mt (2870 ft), the highest point of the is. Green turtles, land-crabs, and fish are abundant. Noted, too, for its tern. George Town, in the NW., supplies the only good anchorage. It is connected by telegraph with St Vincent, St Helena, and Sierra Leone and is an important station of Cable and Wireless Ltd, whose manager is normally appointed Resident Magistrate and represents the Governor of St Helena. Pop. (1954) 173, of whom 133 were St Helenians and the rest British. See Darwin, *A Naturalist's Voyage*, 1889.

Ascension, Right, of a heavenly body, the arc of the celestial equator measured from the first point of Aries to the foot of the perpendicular on the equator from the body. This perpendicular is a great circle from pole to pole of the heavens. R. A. is always measured eastward from 0° to 90°. In every hour of time 15° of equatorial arc passes the meridian, so that if the first point of Aries passes the meridian at twelve o'clock midnight, the bright star Capella, which has a R. A. of 79°, was on the meridian 5 hrs 16 min. earlier. The adjective 'right,' which is always used with the term ascension, is used in the sense of 'proper,' and means that the calculation is made on a right sphere, that is, one in which the polar axis corresponds with the polar axis of the heavens.

Ascension Day commemorates Christ's ascension into heaven 40 days after the resurrection, and is consequently celebrated on the fortieth day after Easter. *See also* BEATING BOUNDS.

Asceticism. This word, derived from the Greek *askesis*, covers in Christianity forms of spiritual exercise, and especially the discipline of the body and its appetites to bring it into subjection to the soul (cf. 1 Cor. ix. 27). Mainly of oriental origin, A. has taken many forms at different times, among different peoples, and in different religions. Consisting at its lowest of such mortifications of the flesh as flagellation and torture, we find it to include in its higher forms the uprooting of worldly thoughts and separation from the ordinary relations of life. Varying forms of A. are found in the teachings of the Socratic school, with its view of the soul as imprisoned in the body; of the Stoics and Cynics, with their contempt for the material refinements and comforts of life; and of the Neo-Platonists, who regarded marriage and meat-eating as obstacles to the attainment of divinity. In early Egyptian religion we find A. in the practices of circumcision, fasting, and abstinence from all uncleanness. Among the Jews A. seems to have been confined to special classes, such as the prophets, and to times of special distress, though eremitism appears shortly before the time of Christ amongst the Therapeutae in Egypt and the Essenes in Palestine. The most acute A. is the self-mortification of the Hindu fakirs, while some of its most spiritual manifestations are the meditations and penances of the Buddhists and Persian Sufis. A. has from the beginning played an important part in Christian life, especially in monasticism. In its extreme forms it was attacked in the early Christian Church by Jovianus, Vigilantius, and others. This opposition, developed by such men as Peter of Bruys, Henry of Lausanne, Wycliffe, and Jerome of Prague, reached its height in the Reformation.

Asch, Sholem, *see* ASH.

Asch, see AS.

Aschaffenburg, Ger. tn in the Land of Bavaria (q.v.), on the Main (q.v.), 168 m. NW. of Munich (q.v.). It is on the site of a Rom. fortress. The Renaissance castle of *Johannisburg*, severely damaged during the Second World War, was once the residence of the Archbishops of Mainz. The tn is a riv. port, a holiday resort, and has a trade in wine, paper, and timber. Pop. 52,000.

Ascham, Roger (1515-68), scholar and writer, a native of the Yorks vil. of Kirby Wiske, near Northallerton. He was adopted by Sir Anthony Wingfield, who had him educ. with his own sons. Impressed by A.'s scholarship his patron sent him in 1530 to St John's College, Cambridge, where he proved himself a brilliant classical student and gained a fellowship. He took his B.A. degree in 1534, and his M.A. in 1537. The fame of his knowledge of Greek brought him many pupils. The year 1545 saw the pub. of his delightful prose treatise on archery,

Toxophilus, which secured for him the favour of Henry VIII and a pension of £10. In 1546 he succeeded Sir John Cheke as public orator of his univ., and in 1548 became tutor to the Princess Elizabeth, an appointment which he relinquished 2 years later owing to a quarrel with the lady's steward. From 1550 to 1553 he was in the suite of the Eng. ambas. at the court of Charles V, during which time he visited various places on the Continent, including Italy. In 1553 appeared his *Report on the Affairs of Germany*. During his absence abroad he was appointed Lat. secretary to Edward VI, an office which, through Bishop Gardiner's influence, he was able to continue under Mary in spite of his Protestant views. Under Elizabeth he became secretary and tutor, retaining these offices till his death. His chief work, *The Scholemaster* (ed. by J. E. B. Mayor, 1863), a treatise on education, was pub. by his widow in 1570. His letters are to be found in Dr Giles's ed. of his work (3 vols., 1864-5). *See also* studies by A. Katterfeld, 1879, and S. A. and D. R. Tannenbaum, 1946.

Ascherleben, Ger. tn in the dist. of Halle, 29 m. NW. of Halle (q.v.). It was once the seat of the house of Ascania (q.v.), and has a 15th-cent. church. There are lignite and potash mines in the dist., and there are textile, steel, and chemical industries. Pop. 42,000.

Asciano, It. tn in Tuscany (q.v.), 13 m. SE. of Siena (q.v.). It has Rom. remains, and sev. fine old churches. Pop. (tn) 4400; (com.) 9600.

Ascidicea (Gk *askidion*, little bottle), the sea-squirts, an order of Tunicates which may be fixed and individual, free-swimming and colonial; the adults have neither a tail nor a notochord. *Molgula* and *Ascidia* are genera.

Asцитes (Gk *askos*, skin-bag), abnormal collection of serous fluid in the peritoneal cavity. The fluid, which coagulates on standing, is usually clear and of a pale yellow colour. It is due to systematic circulatory failure, obstruction of the portal circulation (*see* CIRRHOSIS), or to irritation of the peritoneum.

Asclepiad, form of metre invented by the Gk poet Asclepiades (3rd cent. BC). The Asclepiadic line consists of a spondee followed by 2 (or 3) choriambi and an iambus. The best-known poems in this metre are Horace's. An example in English is:

Look now, over the hill, speeding beyond,
lost in the cloud, it flies.

Asclepiadaceae, family of dicotyledons, perennial herbs or climbing shrubs, mostly tropical, about 1700 species. Leaves are simple and opposite, flowers regular, perfect and 5-parted, in cymes, racemes, or umbels; ovary superior, with 2 carpels, united by their styles, with the anthers of 5 epipetalous stamens united to the edge of the stigma. Pollination is by insects. Important genera are *Arauja*, *Asclepias*, *Calotropis*, *Cynanchum*, *Hoya*, *Orypetalum*, *Sarcostemma*, *Staphelia*, etc.

Asclepiades, Gk lyric poet of Samos, who

fl. in the 2nd cent. BC. Supposed to have been the master of Theocritus and inventor of the metre called after him, *metrum Asclepiadeum*. Forty-five of his epigrams have survived. See W. R. Paton, *Anthologia Graeca* (with trans.), 1916.

Asclepiades (124-56 BC), Gk physician of Prusa, Bithynia, who settled in Rome 91 BC, where he estab. Gk medicine on a respectable footing. He founded the 'Methodist School.' His treatment consisted of open-air exercise, bathing, and change of diet. The fragments of his writings which have survived were trans. into English, with a biography, by R. M. Green, 1955.

Asclepias (after Aesculapius, the god of medicine), Milkweeds; genus of herbs or shrubs of the New World and S. Africa. *A. curassavica*, Blood flower, is a beautiful tropical perennial for a hothouse. *A. decumbens*, *A. incarnata*, *A. syriaca*, Silkweed, and *A. tuberosa* are hardy N. Amer. showy border plants.

Asclepius, see AESCULAPIUS.

Ascoli, David d', Jewish author of the 16th cent. He issued a manifesto against Pope Paul IV for unfair measures against the Jews, and was the author of *Apologia Hebraeorum* (Strasburg, 1559).

Ascoli, Francesco (Cecco) Stabili d' (1257-1327), It. poet and astrologer. At one time astrologer to Carlo di Calabria, brother of the King of Naples, he incurred the enmity of the Inquisition, was driven from the professorship of astrology at Bologna, and finally burnt at the stake. His chief works were *De principiis astrologiae*, in Latin, and a didactic allegory, *L'Acerba*, in Italian.

Ascoli, Graziadio Isaia (1829-1907), It. linguistic scholar, b. Gorizia (N. Italy). He was the founder of It. linguistics. Prof. of linguistics in the Milan Accademia Scientifico-letteraria (which later became Milan Univ.), 1861. Founder of *Archivio Glottologico Italiano* (1873). Pub. works on Friulan (1846), oriental languages (1854, 1855, 1861), Ladino (1876), Rumanian (1865), Iranian (1866); also on Gk, Indian, Celtic, on It. dialects, on Franco-Provençal dialects, and other linguistic subjects. He attempted to prove the common origin of the Indo-European and of the Semitic languages.

Ascoli di Satriano, It. tn in Apulia (q.v.), 19 m. S. of Foggia (q.v.). It has a cathedral, and is supposed to be the site of the anct Asculum, or Ausculum, the scene of the defeat of the Romans by Pyrrhus (q.v.) in 279 BC. Pop. 9000.

Ascoli Piceno: 1. Prov. of Italy, in the S. of the Marches (q.v.). It is in the Apennines (q.v.) and is mainly mountainous, very high in the W., but with an undulating coastal plain on the Adriatic in the E. The chief rvs. are the Aso and the Tronto. The prin. tns include A. and Fermo (qq.v.). Area 822 sq. m.; pop. 331,000.

2. (anct **Asculum Piceum**) It. tn, cap. of the prov. of A., on the Tronto, 52 m. S. of Ancona (q.v.). It has a cathedral (14th-19th cents.), other interesting

churches, and a notable picture gallery, as well as a museum housed in the 13th-cent. 'People's Palace.' There are glass and pottery manufs., and silkworm culture. Pop (tn) 20,700; (com.) 38,100.

Ascomycetes, large class of fungi, the Sac Fungi, whose spores are contained within asci or tubes. It contains over 12,000 species in 15 families or 1564 genera.

Asconius Pedianus, Quintus (9 BC-AD 76), Rom. grammarian; author of a commentary on Cicero's speeches, part of which has survived (in *Pisonem*, *pro Scauro*, *pro Milone*, *pro Cornelio*, and in *Toga candida*). The MS. was rediscovered by Poggio Bracciolini in 1416; the best ed. accessible to Eng. readers is that of A. C. Clark (1907). See J. N. Madvig, *De Asconii Pediani Commentariis*, 1828.

Ascot Heath, Berks, 6 m. SW. of Windsor, is famous for its circular race-course, nearly 2 m. long, the scene of the ann. Ascot meeting in June. King Edward VII took great interest in the alteration and improvement of the course in 1902.

Ascot Vale, suburb of Melbourne (q.v.), Australia, with the Royal Agric. Society's show grounds. Pop. 15,980.

Asculum, see ASCOLI DI SATRIANO.

Asculum Piceum, see ASCOLI PICENO.

Asdic, electronic device fitted in warships for the detection of submerged submarines. The equipment emits pulses of high frequency sound which pass through the water. When the pulses strike a solid object such as the hull of a submarine or a whale, the operator hears an echo or 'ping.' Skilled operators can detect the difference between different types of echo. The name ASDIC is derived from the initials of the Allied Submarine Detection Investigation Committee, set up during the First World War owing to the very serious shipping losses suffered from U-boat attack. Although the principle of A. remains unchanged, the equipment has been much improved since its invention, and during the last war it was a vital factor in the many 'killings' achieved by the Allies during the almost continuous warfare that had to be waged against enemy submarines. A. has recently been adapted for use by naval helicopters. The equipment is lowered into the sea as the helicopter hovers above and the operator in the aircraft listens for echoes, as does his colleague afloat. A. has also been installed in some long-distance trawlers in recent years and has proved useful in the detection of large shoals of fish.

Aselli, Gasparo (1581-1626), It. anatomist, b. Cremona. He is best known for his discovery of the lacteal vessels, described in his *De Lactibus* (Milan, 1627), which was also the first book to contain anatomical plates printed in colours. A. was prof. of anatomy and surgery at Pavia.

Asellus (Lat. 'little ass'), small isopod crustacean commonly found in ponds and stagnant water in Britain. It belongs to the family Asellidae, and is allied to the wood-lice.

Asepsis, absence of injurious micro-organisms. A condition is said to be *aseptic* when no pathogenic germs are present; *antiseptic* when there is present some substance designed to destroy or prevent the development of such germs.

Aesir, or **Aesir**, race of Scandinavian gods. Odin was their chief, Thor, Baldur, Bragi, Heimdal, and Loki next in importance; the chief goddesses were Freyja, Frigg, Saga, Snotra, and Idun.

Asexual, biological term applied to plants and animals which can reproduce their kind and are yet devoid of sex. In the case of some algae (plants which include seaweeds), e.g. *Ullothrix*, a cell will produce sev. ciliated spores which form new plants either by themselves or by fusion with spores identically the same (and consequently sexless). In the case of some animals, e.g. *Amoeba*, the solitary cell divides in two, thus forming 2 individuals; this process is known as *self-division*, and occurs also in low plant life. Budding or germination is the outgrowth of buds on a parent plant or animal which form new life of a similar character (see SEX). The reproduction of multicellular animals by budding is usually distinguished from parthenogenesis (the development of an unfertilised egg), which may be reproduction without a 'sexual' process, but implies the development of sex and subsequent loss of the fertilisation process. By contrast, the bud always consists of a number of cells, and does not evolve from a single cell, which would be a gamete.

Asgard, 'tn of the Aesir,' the home of the Scandinavian gods, or Aesir. Like the Gk Olympus it rose from the earth (midgard or middle world). In A. Odin and the 12 Aesir dwell, holding council every day under Yggdrasil, the ash-tree. The palace of the gods was Gladsheim, that of the goddesses Virgulf; here also was Valhalla, the home of heroes slain in battle.

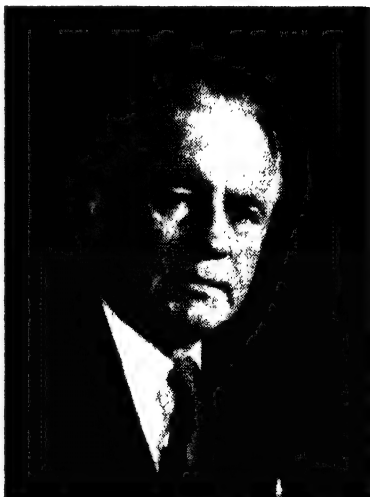
Asgeirsson, Asgeir (1894-), educationist and politician, President of Iceland since 1952.

Asgill, Sir Charles (1762-1823), son of the 1st baronet, was taken prisoner in the Amer. War of Independence, and chosen by lot to be executed in the place of Capt. Lippincot, whom the English refused to yield to Washington for hanging an Amer. officer. A. was ultimately released, and became a general.

Ash, Edward (1763-1829), physician. b. London, is known because of his discovery that every time metals which are unequally oxidisable are brought in contact electricity is generated; this is the base of the galvanic battery.

Ash (or **Asch**), **Sholem** (in Heb. *Shalom*) (1880-1957), Yiddish and Heb. writer, b. Kutno (Poland), in 1910 emigrated to the U.S.A., where he became naturalised, 1920. His first Yiddish short stories appeared in Jewish newspapers and magazines, 1900; his Heb. stories in *Tushiya*, Warsaw, 1902 onwards. His work *Dos shetlet*, still a classic, was pub. 1904 (Eng. trans. *The Town*, 1907). In W. Europe he became

known by his play *God der Rache* ('God of Vengeance'), which Reinhardt produced in 1907 in Berlin, and which was the first E. European Jewish play to be produced on a W. European stage. A. wrote numerous short stories and novels, which were trans. in sev. European languages (Eng. *Three Cities*, 1933, *Salvation*, 1934, *Mottke the Thief*, 1935, *Mother*, 1937, *Three Novels*, 1938, *Song of the Valley*, 1939, *One Destiny*, 1945, *East River*, 1946, *Tales of my People*, 1948, and *Passage in the Night*, 1953). He also wrote historical and religious novels and books of philosophy (*Kiddush*



Ministry for Foreign Affairs, Reykjavik

ASGEIR ASGEIRSSON

ha-Shem, 1916, *The Witches of Castella*, 1917, *The Nazarene*, 1939, *What I Believe*, 1941, *The Apostle*, 1943, *Moses*, 1951, and *Prophet*, 1955; plays (*Sabatay Zvi*, 1909, *Der bund fun shwach*, 1910, and *Jiftachs tochter*, etc.); and biblical stories (*Krecz Israel*, 1911, and *Masselech fun chumish*, etc.). His work shows a great power of observation and a gift of vivid description. In the books dealing with E. European subjects (*The Town*, *Three Cities*—Petersburg, Warsaw, Moscow—and so forth) he describes the conditions of the poor Jewish masses with affectionate and realistic insight.

Ash, name applied to sev. plants of the genus *Fraxinus*, which are related to the olive, privet, and lilac. *F. excelsior* is the common A.; *F. ornus* the manna A. or flowering A. of S. Europe; *F. americana*, White A.; *F. caroliniana*, Water A.; *F. lanceolata*, Green A.; *F. nigra*, Black A.; *F. pennsylvanica*, Red A.; *F. quadrangulata*, Blue A.; and *F. tomentosa*, Pumpkin

A. The Prickly A. is a shrub, *Zanthoxylum americanum*.



Ash, Mountain, or Rowan-tree, is the *Sorbus aucuparia* of the family Rosaceae. **Ash of Jerusalem,** old term for woad or dyers' weed.

Ash Wednesday, first day of Lent, derives its name from the Catholic ceremony of sprinkling on the heads of the faithful ashes from the burning of the undistributed branches of consecrated palm. The custom is said to have been instituted by Gregory the Great, and was finally sanctioned by Pope Celestine III in 1191.

Ashango, name of an African tribe of the Fr. Congo. There are sev. subtribes, including the pigmy Obongos. The A.s are fetish-worshippers and slave holders, and are remarkable for being fully clothed.

Ashanti, ter. of Ghana (q.v.), W. Africa, consisting largely of forest country. It is divided into 2 provs., the E., with H.Q. at Kumasi, and the W., with H.Q. at Sunyani. Area 24,379 sq. m.; pop. 818,904 (1948 census). The country is inhabited by a large number of confederated tribes, the prin. of which are the Bekwais, Kokofus, Nkwantas, Kumasis, Agunas, Mampons, Nantaw, Kumawus, Bompatas, Juabins, and Adjisus. Each tribe has its own head, but from time immemorial the King of Kumasi has been recognised as the king paramount of the confederation. The country is hilly and, on the whole, unhealthy. The land is fertile and well cultivated near the tns, producing, amongst other things, rice, maize, millet, cocoa, sugar, fruits, gums, and timber. Gold, rubber, kola, and cocoa are exported in considerable quantities. Kumasi (Coomassie) is the chief tn (pop. 77,689). Agriculture is expanding and coffee plantations are also being formed. There are rich forests of mahogany and cedar. The ann. gold output is valued at £500,000. Railway tracks traverse the once forbidding Prah; Kumasi is the railroad of 2 lines which link up with the coast, only

120 m. distant. A motor road passes N. over swamps, escarpments, and rivs. to emerge from the forest belt into a land of open country. Until 1896, when it became a Brit. protectorate, A. was a separate native kingdom. The Ashantis have long been noted for their warlike and predatory tendencies. According to tradition they derive their origin from the fugitives driven southwards about 300 years ago by Muslim tribes from Senegal and the Niger. Their attacks on the Fantis led to the first Brit. expeditions, 1807-11. In 1874 Sir Garnet Wolseley captured and burned Kumasi. Another expedition, in 1895-6, ended in the removal of the king, Premph, and the estab. of the protectorate. Further troubles were suppressed by the expedition of 1900, and the country was definitely annexed by Great Britain in 1901. Before the Brit. settlement, human sacrifices were a regular part of the fetish religion, and they still occur covertly.

The Gold Coast Gov.'s confidence in the loyalty of the Ashantis led to the return from exile of Premph; he d. in 1931, and was succeeded by his nephew, Ossi Ayyiman Premph II, as Omanheue of Kumasi, 7 July 1931. In 1935 the Golden Stool of A., which since the 17th cent. has been accepted as the symbol of the soul of the A. nation, was restored to the A. people, when Ossi Ayyiman was proclaimed the new Ashantihene (or A. overlord) Premph II. In effect the restoration marked the revival of the old A. confederacy for purposes of domestic policy. The Golden Stool is so named because it is covered with plates of pure gold and hung with golden balls. In 1956 the strongest representations were made, both officially and unofficially, to the Brit. Gov. by A. nominees, who protested with some degree of vehemence against the proposed constitution which makes the Ghana Gov. unitary as opposed to the federal gov. which an impressive section of the A. demand. They openly declared and warned that rather than be subservient to southerners the A. would resort to insurrection. Riots did occur on this issue in Jan. and May 1955. It should be noted that although overall there is a high illiteracy rate in Ghana, the illiteracy rate is much higher among the Ashantis than among the southerners. This means that the most articulate politicians are from the S. Officers of the armed forces, too, are mainly being chosen from the S., while the rank and file are from the N. It is questionable whether this fact has been thoroughly appreciated and the significance understood; in any widespread internal disorders any natural antipathy the northerners may have for the southerners might be reflected in mass disaffection within the armed forces.

See J. Dupuis, *Journal of a Residence in Ashanti*, 1824; H. J. Rickotts, *Narrative of the Ashanti War*, 1831; J. Beecham, *Sketch of Ashanti*, 1841; J. D. Hay, *Ashanti and the Gold Coast*, 1873; H. Brackenbury and E. L. Hayshe, *Fanti and Ashanti*, 1873; A. C. Beaton, *The*

Ashantees, 1878; H. Brackenbury, *The Ashanti War* (2 vols.), 1874; C. C. Reinhardt, *History of the Gold Coast and Ashanti*, 1895; R. S. S. Baden-Powell, *The Downfall of Prempeh*, 1896; H. R. Beddoes, *The Military Operations in Ashanti*, 1900, 1901; A. C. H. Armitage and A. F. Montanaro, *The Ashanti Campaign of 1900*, 1901; F. W. Claridge, *History of the Gold Coast and Ashanti* (2 vols.), 1915; H. S. Rattray, *Ashanti*, 1923, *Religion and Art in Ashanti*, 1927, *Ashanti Law and Constitution*, 1929; W. E. F. Ward, *A History of the Gold Coast*, 1949; K. A. Busia, *The Position of the Chief in the Modern Political System of Ashanti*, 1951.

Ashbourne, Edward Gibson, 1st Baron (1837-1913), b. Dublin. He was M.P. for Dublin Univ., 1875-85; attorney-general for Ireland, 1877-80; Lord Chancellor of Ireland, 1885-92, and 1895-1906. He was created a baron in 1885, the year in which he guided the passing through Parliament of the Land Purchase Act known as the Ashbourne Act.

Ashbourne, or Ashborne, mrkt tn of Derbyshire, England, 13 m. NW. of Derby, on the Dove. The fine cruciform church, dating from the 13th cent., has a beautiful spire over 200 ft high known as the 'Pride of the Peak,' and a fine monument by Banks. The grammar school was founded in 1585. Two engagements took place here during the Civil war. A. forms the 'gateway' to Dove Dale. Pop. 5440.

Ashburnham, John (1603-71), Eng. Royalist, friend and agent to Charles I, whom he assisted in various negotiations of the Civil war, including the treaty of Uxbridge and the visit to the Scots army. He is said to have engineered the king's escape from Hampton Court.

Ashburton, Alexander Baring, 1st Baron (1774-1848), Brit. statesman and financier, a son of Sir Francis Baring, founder of the famous banking house of Baring Brothers, and succeeded his father in 1810 as head of the business. From 1806 to 1832 he was the Liberal member for Taunton, Callington, and Thetford. In 1833 he became the moderate Conservative member for N. Essex. He was president of the Board of Trade in Peel's gov., 1834-5, and was created a baron in 1835. As special commissioner to the U.S.A. he concluded the A. treaty of 1842, which settled the NW. frontier between Canada and the U.S.A.

Ashburton, William Baring, 2nd Baron (1799-1864), is best remembered for the salon of his first wife, who entertained many distinguished politicians and writers.

Ashburton: 1. Tn in S. Devonshire, on the Yeo, 10 m. NW. of Totnes. It became a stannary tn in 1328 by a charter of Edward III. It has a fine cruciform church, St Andrew's. Until the Reform Act of 1832 it returned 2 members to Parliament; from then till 1868 one. Pop. 2700.

2. Tn in A. co., S. Is., New Zealand, on the A. R., 53 m. SW. of Christchurch. Pop. 10,160.

Ashburton River, NW. of W. Australia, 400 m. long, flows into the Indian Ocean near Exmouth Gulf.

Ashbury, par. and vil., Faringdon dist., Berks, England, 6½ m. E. of Swindon. Near it is Wayland Smith's forge. Pop. 500.

Ashby-de-la-Zouch, mrkt tn, Leics, England, 16 m. NW. of Leicester. Has manufs. of biscuits and soap. The name derives its suffix from the Norman family of La Zouch, who built a castle here. The castle was rebuilt in the 15th cent. by Sir Wm Hastings, and served for some time as a prison of Mary Queen of Scots. It was demolished by the parliamentarians during the Civil war. The fine old church of St Helen contains a 'finger pillory,' and the tombs of that branch of the Hastings family which received the earldom of Huntingdon. Pop. 6516.

Ashcroft, Dame Peggy (1907-), Eng. actress. Her first success was with Matheson Lang in *Jew Suss* at the Duke of York's Theatre, London, in 1929. She is to-day a leading player both in Shakespearean and in modern plays, being especially noted for beauty of voice and clarity of diction. She excelled as Ophelia, Juliet, Cleopatra, and as Hedda Gabler. Modern plays in which she has appeared include *Eduard My Son*, *The Heiress*, *The Deep Blue Sea*, and *The Chalk Garden*. Created D.B.E. in 1956.

Ashdod (modern **İsdu**, or **Esdú**), Palestine, 22 m. SW. of Joppa, now a mud vil., was formerly one of the chief Philistine cities. The Philistines brought here the ark of the covenant and placed it in the temple of Dagon. It figures in the N.T. under the name of Azotus. It was captured by the Assyrians in the 8th cent., and by the Egyptians in the 7th cent. BC. After being sacked by the Maccabees it was rebuilt by the Romans.

Ashdown, vil. in the Vale of the White Horse, Berks, England, 3½ m. NW. of Lambourn. In 871 Alfred won a victory over the Danes at A.; near by the figure of a horse has been cut on the chalky hillside (see WHITE HORSES AND HILL FIGURES).

Ashdown Forest, area of heathland in Sussex, England, lying between E. Grinstead and Uckfield, formerly thickly wooded. There is a noted golf course laid out on part of A. F.

Ashé, Simeon (d. 1662), Eng. Puritan divine, educ. at Emmanuel College, Cambridge. When the Civil war broke out he became chaplain to the Earl of Manchester, and after the war became rector of St Austin and a Cornhill lecturer. He was among the divines who went to meet Charles II at Breda.

Asher, 'blessed,' tribe whose lands reached from Lebanon to Dor; descended from A., the eighth son of Jacob, born to him by Zilpah the handmaid of Leah.

Ashera, see ASTARTE.

Ashes, residue from the burning of animal and vegetable matter. Vegetable A. are composed of oxygen, hydrogen, and carbon. Animal A. consist principally of phosphate of lime, with traces of salts of lime, magnesia, and soda. Mineral or volcanic A. consist of mineral fragments ejected from volcanoes; they may form cinder cones around the volcanic vent or be carried by the wind to fall to the ground

as ash beds. Volcanic ash from Krakatoa encircled the world after the eruption of 1883. *See also* VOLCANO.

Ashes, The, mythical trophy for which England and Australia compete in test match cricket. Its origin goes back to 1882 when Australia beat England at the Oval and the *Sporting Times* pub. a mock obituary notice: 'In affectionate remembrance of English Cricket which died at the Oval on 29th August 1882, deeply lamented by a large circle of sorrowing friends and acquaintances. R.I.P. N.B. The body will be cremated and the ashes taken to Australia.' When the Hon. Ivo Bligh took an Eng. team to Australia the following winter it was said that he had gone to recover the A., and his victory by 2 matches to 1 against Murdoch's team was marked by the presentation to him of a small urn containing the ashes of a bail. This urn, also referred to as the A., is now in the museum at Lord's. It has never been competed for as a trophy.

Ashville, co. seat of Buncombe co., N. Carolina, U.S.A., on Fr. Broad R., 210 m. W. of Raleigh. Situated in a picturesque setting, it is a favourite health resort. It has manufs. of cotton, furniture, leather, and machinery. Pop. 53,000.

Ashfield, Edmund (fl. 1680-1700), Eng. painter, pupil of Michael Wright. According to Horace Walpole, he was equally clever with oils and pastels.

Ashfield, metropolitan municipality of Sydney, in Cumberland co., New S. Wales, Australia, situated in the inner W. portion of the metropolis. Pop. 39,080.

Ashford, Daisy, authoress, b. Petersham, Surrey. She was educ. at The Priory, Haywards Heath, and her claim to immortality is based on a novel which she wrote at the age of 9. Pub. in 1919, when she was grown up, *The Young Visitors*, which was sponsored by J. M. Barrie, won instantaneous success by its artless charm and became a sort of juvenile classic. Miss Ashford married J. P. Devlin and lived in Norwich.

Ashford, urb. dist. of Kent, England, on the R. Stour, 14 m. from Canterbury. It has a fine old church with a Perpendicular tower. Cider-making, brick-making, and tanning are the chief industries, and there are large railway workshops. Pop. 24,780.

Ashi (352-427), Jewish doctor, b. Babylon. He was president of the academy of Sura. He collected all the Jewish laws, doctrine, and tradition into the Talmud of Babylon, which work was completed at the end of the 5th cent. by Rabina.

Ashikaga, city famous for its silk industry, in Tochigiken, Japan, about 50 m. N. of Tokyo. Founded in the 8th cent., it was once the seat of an anc. academy of Chinese lore, and a statue of Confucius is still existent here. Pop. 77,000.

Ashington (anc. *Assundun*), vil. of Essex, England, on the R. Crouch, where Edmund Ironside was defeated by Canute in 1016. Canute built the minster (1020) which is still in use as the par. church. Pop. 1270.

Ashington, tn of Northumberland,

England, 4 m. from Morpeth, centre of a coal-mining dist. Pop. 28,500.

Ashira, Negro tribe inhabiting the coastal dist. W. of the Fr. Congo, and between the Congo R. and the Equator. They are of good physique, and are skilful workers in iron and copper, and in cloth-weaving.

Ashkelon, *see* ASCALON.

Ashkenaz, N. race mentioned in Gen. x, who lived in Armenia. They were supposed to be descended from Gomer.

Ashkenazim, Ger.-Polish Jews, who arrived in this country via Holland, chiefly under Wm of Orange, and estab. a synagogue here (*see also* SEPHAIDIM).

Ashkhabad: 1. Oblast (prov.) of Turkmen S.S.R. of Soviet Union, bounded S. by Iran, W. by Caspian Sea. It has irrigated and dry farming (orchards, wheat, cotton) and there are coal, natural gas, and sulphur deposits. There are fisheries along the Caspian Sea coast. Industry is centred at A., Krasnovodsk, and Kizyl-Arvat. Area 87,000 sq. m.; pop. (1946) c. 550,000, Turkmen and Russians.

2. (*Poltoratsk*, 1920-1) Cap. of A. oblast and Turkmen S.S.R. of Soviet Union. It has cotton-ginning and silk-spinning plants, and glass and meat-packing factories. It was badly damaged by an earthquake in 1948. Pop. 120,000.

Ashland: 1. City of Boyd co., Kentucky, U.S.A., with a large trade in iron, steel, and woollen goods. It is a rail and river shipping point, with an airport. It manufs. bricks, ballast, chemicals, leather, shoes, and food products. Pop. 31,131.

2. Tn of Hanover co., Virginia, U.S.A., 16 m. N. of Richmond; it is the seat of Randolph-Macon College. Pop. 2610.

Ashlar, squared building stone with fine joints, laid in regular courses.

Ashley, Lord (1621-83), Eng. politician, was the early title of Anthony Ashley Cooper, 1st Earl of Shaftesbury (q.v.).

Ashley, Sir William James (1860-1927), Brit. economist, educ. at Balliol College, Oxford. He became prof. of political economy at Toronto, and later prof. of economic hist. at Harvard. He returned to Birmingham to organise a faculty of commerce at the univ. there, the first of its kind in England. His works include *Introduction to English Economic History and Theory*, 1888-93, and *Economic Organisation of England*, 1914. A. was knighted in 1917.

Ashmedai, *see* ASMODEUS.

Ashmole, Elias (1617-92), antiquary, the founder of the Ashmolean Museum at Oxford, b. Lichfield. He studied law, and in 1638 became a solicitor in Chancery. In 1645 he became one of the gentlemen of the ordnance in the Royalist garrison at Oxford, and afterwards entered Brasenose College, applying himself to natural philosophy, mathematics, and astronomy. In 1660 Charles II appointed him to the position of Windsor herald. He was called to the Bar in the same year and made an F.R.S. In 1677 he presented to Oxford Univ. his collection of curiosities, and subsequently bequeathed his library to the univ.

Ashmolean Museum, Oxford, founded (1683) to house the collections given to the univ. by Elias Ashmole (1617-92) (q.v.), which included the well-known collection of natural and artificial curiosities acquired by Ashmole from the Tradescant family at Lambeth. For two cents it was housed in the old Ashmolean building in Broad Street. About 1860 the natural hist. exhibits went to the Univ. Museum and the MSS., books, and coins to the Bodleian (q.v.); and in 1886 the ethnographical specimens went to the Pitt Rivers Museum. In 1894 the archaeological material, greatly expanded by



Courtesy Ashmolean Museum
THE ALFRED JEWEL

Arthur Evans (keeper, 1884-1908), was moved to an extension of the univ. galleries in Beaumont Street, and in 1908 this joint institution was renamed the A. M. of Art and Archaeology.

The museum possesses the Alfred Jewel (of gold, enamel, and rock-crystal, made in the 9th cent., probably for King Alfred, and found near Athelney, Somerset, in 1717), Guy Fawkes's lantern, and other historical relics, very comprehensive and valuable collections of European, Near E., and oriental art and archaeology, and extensive series of ancient and modern coins and medals. The museum is the centre of fine art and archaeological study in the univ. and possesses an important library and gallery of paintings and drawings.

Ashmunin, small vil. of Upper Egypt. It is situated a few m. from the l. b. of the R. Nile. It possesses the ancient ruins of Hermopolis Magna.

Ashokan Reservoir, reservoir constructed 13 m. W. of Kingston, New York, for

collecting the main part of the New York water supply from the Schoharie, Esopus, and Catskill watersheds. Approximately 12 m. by 1 m. with a maximum depth of nearly 200 ft.

Ashover, par. of Derbyshire, England, near Chesterfield, engaging in fluorspar mining and agriculture. Pop. 2500.

Ashraf, small scattered tribe of African Arabs. They inhabit a region near Tokar and the Amara country to the N. of Snakin. They claim descent from Mohammed, hence their self-designated name (Shurefa), Sherif being the term applied to his descendants.

Ashridge Park, estate in Herts, Bucks, and Beds, England, formerly belonging to the Dukes of Bridgewater and Earls of Brownlow. A portion, including Ivinghoe Beacon, has been acquired by the National Trust and another portion forms part of Whipsnade (q.v.) Zoological Gardens.

Ashridge College was originally the Bonar Law College, Berkhamsted, Herts, the Conservative centre for educating persons in economics, politics, social science, and political hist., with special reference to the development of the Brit. Constitution and the growth and expansion of the Brit. Commonwealth. Independent courses on similar lines are still organised at this imposing mansion, built by Wyatt (1808).

Ashtabula, city of Ohio, U.S.A., on Lake Erie, 55 m. N.E. of Cleveland. It is an iron ore transshipment point. Among its manufs. are leather goods and agric. implements. A great proportion of the pop. are of Finnish extraction. Pop. 23,700.

Ashthead, since 1933 a ward of Leatherhead (q.v.) urb. dist., mentioned in Domesday Book (as *Stede*), and for long a small agric. vil. Tiles and bricks were made here in Rom. times (before AD 200) and also in the 14th and late 18th cents.

Ashton, Frederick (1906-), dancer and choreographer, b. Ecuador. A pupil of Massine and Marie Rambert, he presented his first ballet, *The Tragedy of Fashion*, in 1926. For the Ballet Club between 1930 and 1936 he staged many ballets, including *Capriol Suite*, 1930, and also produced *Facade*, 1931, and other works for the Camargo Society. During this period sev. of his ballets were taken into the repertory of the Vic-Wells Ballet, the most popular being *Les Rendezvous*, 1933, and *Facade*, but it was not until 1935 that he joined the company as resident choreographer, a post he has held ever since. His 20 years with the company have estab. him as the leading Eng. choreographer, with a reputation that is international. Among his best-known works are *Apparitions*, 1936, *Les Patineurs*, 1937, *Symphonic Variations*, 1946, *Daphnis and Chloë*, 1951, and 2 full-length ballets, *Cinderella*, 1948, and *Sylvia*, 1952. He has also worked as guest choreographer with the Ballet Russe de Monte Carlo, Ballet Theatre, the New York City Ballet, and the Royal Dan. Ballet, for whom he produced a full-length ballet, *Romeo and Juliet*, in 1954. Awarded the C.B.E. in 1950.

Ashton-in-Makerfield, urb. dist. in

Lancs, England. There are large collieries, and iron goods are extensively manuf. Pop. 19,100.

Ashton-under-Lyne, manufacturing tn in the great industrial belt of S. Lancs, England, 6 m. from Manchester; the prin. industries are cotton spinning, calico printing, bleaching, dyeing, finishing of textiles, cloth weaving, iron founding, engineering, coal-mining, the manuf. of air conditioning plant, filter equipment, and cigarettes. Pop. 46,490.

Ashur, name of the first cap. of Assyria (q.v.). Its site at Qala'at Sherqat, on the W. bank of the Tigris c. 50 m. S. of Mosul, was excavated by the German Andrae in 1902-14. There were 3 *ziggurats* (q.v.) and a large temple of Ishtar, consort of the city's patron god A. (see ASSUR), which was traced back to an original archaic shrine. The excavation is a fine example of careful stratigraphical investigation. Pub. of the finds, including many inscriptions, continues.

Ashurbanipal, or **Assur-bani-pal**, King of Assyria, 669-633 BC, succeeded his father Esarhaddon at Nineveh. The chief events of his reign were the maintenance of Assyrian control in Egypt, the defeat of the Elamite Teuman, and the sack of Babylon in 648 BC following the revolt there led by his brother Shamash-shumukin. A. was patron of the arts and learning. He collected at Nineveh (q.v.) a large library of cuneiform texts and literature, now, like his reliefs, in the Brit. Museum. See ASSYRIA.

Ashwell, Lena (Lady Simson) (1872-), actress, daughter of Commander Pocock, R.N. Studied at the Royal Academy of Music. First appearance in 1891 in *The Pharisee*. She managed successively the Savoy Theatre and the Great Queen Street Theatre, which she reopened as the Kingsway Theatre.

Asia, the largest continent, occupies the N. portion of the E. hemisphere, extending beyond the Arctic circle and nearly reaching the equator. It contains about one-third of the whole of the dry land, and one-twelfth part of the whole surface of the globe. The philological origin of the name is unknown, though it seems probable that it was at first used with a restricted local application, gradually extended to the whole continent. Geographically speaking, Europe is a mere appendix to A., and exact delimitation in that sense is impossible, though the line of separation from Africa is better defined by the Red Sea. The N. boundary of A. is the Arctic Ocean, the extreme N. point being Cape Siyvero-Vostochny. The S. boundary it is impossible to fix with exactitude, but the volcanic chain of is. which can be traced through the Molucca and Sundra Is. may be taken as the limit. The S. coastline is much more irregular, and broken by the 3 great peninsulas of Arabia, Hindustan, and Cambodia. The Mediterranean and Black Seas form natural W. limits to the continent, as does the Red Sea lying between A. and Africa. The Ural R. and Mts are the common conventional boundaries with Europe N. of the Caspian, whilst the

Manych depression is used as the limit of A. between the Black and the Caspian Seas, and the Bering Strait, 36 m. wide, separates A. from America. For information on A. contained in this encyclopaedia, see the following main articles (in alphabetical order): AFGHANISTAN; ARABIA; ARYAN; ASSYRIA; BABYLONIA; BALUCHISTAN; BUDDHISM; BURMA; CENTRAL ASIA; CEYLON; CHINA; HEBREW; HIMALAYA; HINDUISM; INDIA; INDIAN SUB-CONTINENT; INDO-CHINA; IRAQ; ISLAM; ISRAEL; JAPAN; JEWS; KARAKORUM; KOREA; KURDS; MALAYA; MANCHURIA; MONGOLIA; PAKISTAN; PALESTINE; PERSIA; RUSSIA; SEMITES; SIBERIA; SYRIA; THAILAND; TIBET; TRANSJORDAN; TURKESSTAN; TURKEY. See also the individual articles on persons, places, and subjects.

Asia Minor, **Anatolia**, or **Anadolu**, obsolescent geographical term applied to an area corresponding roughly to present-day Asiatic Turkey. The name Anatolia, first used in the 16th cent., was applied to the country under the Byzantine emperors and was retained by the Turks in the form Anadolu to signify Asiatic Turkey. The hist. of A. M. has a peculiar character owing to its unique geographical position. The bridge between Asia and Europe from very early ages has been the battleground of the E. and W. nations. Thus the hist. of the country is a chronicle of the march of armies and of the rise and fall of small disunited states, rather than the record of the progress of a single state under an independent monarch. In the earliest period of which any knowledge can be gathered, A. M. was the home of various non-Aryan tribes who differed but little from each other. Much light has of late years been thrown on the civilisation of the Hittites or Syro-Cappadocians, the centre of whose power is supposed to have been Boghaz Keui. The date of the great Aryan immigration into A. M. from Europe is unknown, but it was declining in the 11th and 10th cents. BC. The kingdom of Lydia was the next to obtain supremacy, and following the fall of Lydia in 546 BC the Persians became rulers. In 334 BC Alexander the Great invaded A. M., but following his death the dynasty of Seleucus was the most powerful there, though it never held sway over the whole of the country. Then by degrees Rome conquered practically the whole of A. M., and it was the dominant power when Christianity was introduced there. With this introduction of Christianity a great advance took place. The old religions and languages disappeared, and the people, with one language and one religion, began to have a united identity. In the 6th cent. A. M. was rich and prosperous. From the 6th to the 10th cent. Persian and Arab raids took place, and in the 11th cent. the Seljuk Turks became the chief power. Then the Mongol power gained the ascendancy in the 13th cent., to be superseded by that of the Osmanli Turks of Brusa from 1307. Tamerlane swept through the country in 1402, and though the Osmanli supremacy was finally

re-estab., it was after a lengthy contest. Thenceforward the hist. of A. M. becomes the hist. of Turkey (q.v.).

Asiago, It. tn in Veneto (q.v.), on the plateau of the 'Sette Comuni', N. of Vicenza (q.v.). It has an observatory of Padua (q.v.) Univ., is a winter sports centre, and is known for its cheese and wine. There is a large military graveyard. Pop. 3000.

Asiago Plateau. Some of the heaviest fighting on the It. front in the First World War took place on the A. P., notably in the anxious period of the Austro-Hungarian invasion of Italy in Oct. to Dec. 1917. The Austro-Ger. forces having taken Gen. Cadorna's H.Q. at Udine on 30 Oct., being foiled in the effort to force a crossing of the Lower Piave, tried to outflank the new It. lines, which, however, had been reinforced by Brit. and Fr. troops, by a direct assault on the A. P. and mts between the Brenta and Piave. Large bodies of Austro-Ger. troops were flung in vain against the mt masses, but, though the Italians gave up some of the ground, the effort to reach the Venetian plains failed. In the following Dec. the Austro-Ger. forces made a further and desperate attack on the plateau and the upper reaches of the Brenta. Monte Asolone and the summits of Monte Tomba fell to them; but both, together with the Piave bridgehead at Zenon, were retaken by the Italians in Jan. 1918, and their positions on the plateau consolidated.

Asian Review, quarterly periodical, estab. in 1953 to cover current affairs in Asia. It has a literary section and publishes the papers read before the E. India Association; formerly it was *Asiatic Review* (estab. 1886).

Asiatic Society, Royal, institution formed for the furtherance of oriental studies. Monthly meetings are held every year from Oct. to June inclusive, when papers on recent research and discoveries, and on cognate subjects, are read. Its jour. is pub. twice yearly.

Asiatic Turkey, see ASIA MINOR and TURKEY.

Asiatious, see ANTIOCHUS.

Asiento, see ASSIENTO.

Asinius, see POLLIO, GAIUS ASINIUS.

Asir (i.e. 'the inaccessible'), region in Arabia (q.v.) belonging to the kingdom of Saudi Arabia. It extends from a line drawn inland from Birk on the S. border of the Hejaz to the N. border of the Yemen, some 10 m. or more N. of the port of Midi, for about 180 m. in an easterly direction.

Arabian geographers include it within the Yemen, but since the war between Ibn Sa'ud, King of Saudi Arabia, and Yahia, Imam of the Yemen, there have been political changes in this region. Included in the ter. also are the Farsan Is., which were believed to contain oil deposits. The maritime lowland has many fertile areas near the wadis, which are suitable for some cereals and afford pasturage. The chief tns are Abha (A. Sarat) and Jizan (A. Tihamah). Area 14,000 sq. m.; pop. 1,000,000.

Asialium, see ASSISI.

Askania-Nova, nature preservation park (feather grass steppe) in the Kherson oblast of S. Ukraine, 22 m. N. of Perekop isthmus. Founded in 1828. Research institute for cross-breeding and acclimatization of animals (1932).

Askari (Arabic *askar*, army), term used for native soldiers in Africa when trained and officered by Europeans.

Aske, Robert (d. 1537), lawyer, fellow of Gray's Inn. He was a member of an old estab. Yorks family. He led the Pilgrimage of Grace (q.v.) in 1536, but, after gaining considerable successes in his native co., ordered his followers to disperse to their homes on the promise of a royal pardon. Henry VIII invited him to London, allegedly to discuss the reasons for the NE. disturbances. A. was then arrested, tried for high treason, and eventually hanged at York, though he had been promised a pardon by the king. See fictional impression by H. F. M. Prescott, *The Man on the Donkey*, 1952.

Askeaton, mkt tn in the co. of Limerick, Rep. of Ireland, with monastic ruins. Pop. 600.

Asker, see NEWT.

Askern, vil. of the W. Riding of Yorks, England, 6 m. N. of Doncaster, centre of a mining dist.

Askew, Anthony (1722-74), scholar, b. Westmorland, and educ. at Emmanuel College, Cambridge, and at Leyden. He was a practising physician, but is better known as a classical scholar. He helped to develop public interest in rare MSS., scarce eds., and fine copies, and laid the foundations of an extensive library, the Bibliotheca Askeviana. His MS. vol. of transcribed inscriptions is in the Brit. Museum.

Askja, volcano of Iceland. It possesses a huge crater measuring 17 m. in circumference, and rises from a bed of lava called Odátharaun. It is the largest volcano in the is. It throws forth volumes of steam incessantly, and by many eruptions has built up a mt 4832 ft high. See W. G. Lock, *Askja, Iceland's Largest Volcano*, 1881.

Askwith, George Ranken, 1st Baron (1861-1942), Eng. lawyer, educ. at Marlborough and at Brasenose College, Oxford. A. was called to the Bar in 1886. He will be remembered for his success as an arbitrator in labour disputes, having received a good training under Lord James. His conciliatory policy settled many strikes and lock-outs, notably the cotton dispute of 1910 and the transport workers' strike of 1911. During the First World War he was chairman of the Gov. arbitration committee under the Munitions Acts. In 1931 he was chairman of the Malta royal commission (see MALTA). He was made a peer in 1919. Pub. *Industrial Problems and Disputes*, 1920; *British Taverns, their History and Laws*, 1928; *Lord James of Hereford*, 1930.

Asmara, tn of Ethiopia, Africa, about 50 m. SW. of Massawa. It was the seat of governmental residence of the former

It. colony of Eritrea. It was captured by allied troops on 1 April 1941. It is a modern tn, 75 m. by rail from Massawa, with new motor roads to Hassowa, Agordat, and Keren. A. has a fine cathedral and many modern buildings. Pop. (1939) 85,000 (of whom 50,000 were Italians).

Asmodeus, or **Ashmedai**, evil genius of Heb. tradition. He is mentioned in connection with Solomon in the pseud-epigraphical *Testament of Solomon* and in the Talmud. In the apocryphal book of Tobit he slays the 7 successive husbands of the beautiful Sara, daughter of Raguel, because of his own love for her, but is ultimately defeated by Tobias.

Asmoneans, or **Hasmoneans**, family of the Maccabees who delivered Judaea from Antiochus Epiphanes, King of Syria (175-164 bc). Their hist. is to be found in the books of the Maccabees, the last 2 books of the Apocrypha. The name is derived from *Hashmon* (*Asmoneus*: cf. Josephus, *Antiquities* XII. vi. 1), a collateral form of Simeon, founder of the family (1 Macc. ii. 1).

Asnières, Fr. tn in the dept of Seine, on the Seine. It is a NW. suburb of Paris, and a boating centre for Parisians. There are aircraft, perfume, and dye manufs., and some boatbuilding. Pop. 72,000.

Asoka, Emperor of India, grandson of Chandra Gupta, the conqueror of Seleucus. He reigned from 264 to 230 bc over ter. roughly corresponding in area to Brit. India excepting Burma. He was a disciple of Buddha and organised Buddhism as a state religion. There is evidence of his proselytising zeal in rock inscriptions in various dists. of N. India. See Allan Menzies, *The Religions of India*.

Asolo, It. tn in Veneto (q.v.), 18 m. NW. of Treviso (q.v.). It is at the foot of the Alps, looking across the plain to Venice, is a bishopric, and has ant. walls and many old buildings. Browning (q.v.) celebrates the place in his *Asolando*. Caterina Cornaro (q.v.) lived in A. castle. Pop. 7000.

Asp, an ophidian reptile closely related to the Brit. adder, properly termed *Vipera aspis*, of the family Viperidae; it is found in S. Europe. The term is also loosely applied to other snakes, as the *Naja haje*, the spy-slang of Africa, of the family Colubridae. Cleopatra's asp was probably *Cerastes cornutus* or horned viper, of the family Viperidae, found in Arabia, N. Africa, and Syria.

Aspalathum, see SPLIT.

Asparagus, family Liliaceae, genus of over 100 herbs of the Old World. *A. officinalis* is the perennial vegetable, grown for its succulent stems; *A. medeoloides*, the florists' Smilax; and *A. plumosus*, the Asparagus Fern.

Asparagus Stone is a variety of apatite (q.v.), a mineral which is formed chiefly of phosphate of lime.

Aspasia, courtesan of Athens in the 5th cent. bc. In 445 Pericles, after divorcing his wife, made her his mistress, and later was able by his influence to legitimise a son he had by her. She is believed to have had considerable influence over him,

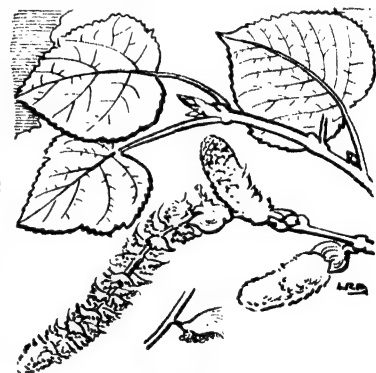
and by some authorities the Samian and Peloponnesian wars are attributed to her. On the death of Pericles she became the mistress of Lysicles, who d. a year after Pericles in 428. There is a bust of her in the Vatican.

Aspasius (fl. c. AD 80), Gk peripatetic philosopher and commentator. Later writers refer frequently to his remarks upon the *Categories*, *De Interpretatione*, and *De Sensu* of Aristotle; but the works themselves are lost, as are also those on the Dialogues of Plato. His only surviving work is a commentary on parts of the *Nicomachean Ethics*, ed. by G. Heylbut, 1889.

Aspatia, mrkt and industrial tn in Cumberland, England, 20 m. from Carlisle by rail. Pop. 3100.

Aspe, Sp. tn in the prov. of Alicante, with a trade in ore and wine. Pop. 8000.

Aspect, in astronomy, position of the planets in certain relative distances. During the vogue of astrology there were 5: conjunction, sextile, quartile, trine, and opposition. Conjunction is applied when 2 planets are in the same lat.; when they are 60° apart they are sextile, 90° quartile, 120° trine, and at 180° (necessarily opposite) in opposition. The only 2 terms surviving are conjunction and opposition, and these take place with or to the sun, respectively, when the differences of apparent geocentric long. are 0° and 180°.



ASPEN

Aspen, *Populus tremula*, tree native to Britain, with leaf petioles strongly compressed laterally, causing the leaves to tremble with the least movement. See POPLAR.

Asper, Hans (1499-1571), Swiss painter, b. Zürich; a contemporary of Holbein, best known as painter of flowers and fruit.

Asper, name of a Turkish money of account. The name means white, and is probably derived from the whiteness of newly coined silver. The A. was a silver coin of very small value, 120 being required to equal in value a piastre. It

is also the name of silver coins in Trebizond, Rhodes, and Genoa.

Asperges, ceremony of sprinkling people with holy water before mass. It is observed in the Rom. Catholic Church, and derives its name from the first word of the invocation *Asperges me, Domine*, etc. (Ps. li. 7). The vessel used to hold the water is an aspersorium, while the sprinkling brush is called an aspergill. The sprinkling of the water itself is called an aspersion.

Aspergillosis, see POULTRY, Common Diseases.

Aspergillum, genus of molluscs of the family Clavagellidae and order Eulamelli-branchiata. *A. javanum*, the watering-pot shell, is so called from its shape, the bivalve shell occurring at the end of a perforated shelly tube.

Aspergillus, genus of minute fungi of the family Moniliales. *A. niger* causes smut (q.v.) of figs and dates, black mould of fruits, vegetables, etc. Some have Eurotium stages; *E. aspergillus* is the mould that forms on jam. Others are used in Japan in making saké or rice wine, shoyu sauce, soy cheese, etc.; elsewhere in making citric acid.

Aspern and Essling, Austrian vils. in the Marchfeld (q.v.). In the battle of A.-E. in 1809 Napoleon was defeated by the Austrians under Archduke Charles (see CHARLES LOUIS).

Aspertini, Amico (1475-1532). It. painter, b. Bologna. He was a pupil of Francesco Francia, and imitated the painters of different periods, though this did not prevent his criticising very harshly the imitators of Raphael. He painted frescoes in a somewhat grotesque fashion, and decorated a large number of buildings, but his character was more original than his talent, for he painted with both hands at once.

Asperula, family Rubiaceae, genus of perennial herbs, European, Asian, and Australian; *A. odorata*, Sweet Woodruff; *A. laurina*, Pink Woodruff; and *A. cynanchica*, Squinancy Wort, are found in Britain.

Asphalt, naturally occurring form of bitumen. It consists of a mixture of hydrocarbons, the elements carbon, hydrogen, oxygen, nitrogen, and sulphur being present. The manner in which the deposits are produced is a matter of some doubt, but they are probably formed by the oxidation and evaporation of liquid petroleum which has found its way from surrounding outcrops of petroleum-bearing strata. The best-known deposit is the 'Pitch Lake' at La Brea, in the SW. corner of the Is. of Trinidad, which covers an area of about 100 ac. It was known from a very early period, for the buccaneros caulked their ships with the material; it is now worked by the New Trinidad Asphalt Co., who export about 100,000 tons annually. Other deposits of A., somewhat different in composition, are found in Venezuela, Cuba, the Dead Sea, and Switzerland. That found at Val de Travers in Switzerland is really a bituminous limestone, and is largely used for preparing A. camits,

which contains a great proportion of limestone, and is much in demand in the form of blocks for street paving and floors. A. is also used for damp-courses in the walls of houses, for preparing waterproof flooring and roofing, and as an ingredient in Japan varnish. An artificial A. is made from coal-tar pitch, and for some purposes is an efficient substitute for the naturally occurring substance.

Asphalter's Work, in building (q.v.), consists of laying asphalt, hot, to form continuous coverings for floors or flat roofs, or to form continuous waterproof membranes ('tanking') below and around basements or other parts of buildings constructed below ground-water level.

Asphodel, common name of Asphodelus (q.v.). Scotch A. is *Tofieldia pusilla*; Bog A. is *Narthecium ossifragum*; both natives of Britain.

Asphodeline, family Liliaceae, genus of Mediterranean herbaceous plants with erect, leafy stems. *A. lutea*, Golden Asphodel or King's Spear, with yellow fragrant flowers, is the best known.

Asphodelus, family Liliaceae, genus of Mediterranean herbs, hardy in Britain; *A. alba*, White Asphodel, *A. cerasiferus* and *A. microcarpus* are perennials, *A. fistulosus* is an ann.

Asphyxia (Gk *a*, not; *sphuxis*, pulse), suspension of vital phenomena due to absence of the requisite proportion of oxygen in the lungs. The condition may be brought about by any obstruction to the passage of air to and from the lung, as in drowning, constriction of the wind-pipe, or the presence of foreign bodies or morbid growths in the air passages; or an insufficient supply of oxygen in the atmosphere breathed; or any interference with the muscular actions which produce breathing, such as may be occasioned by paralysis or great pressure on the walls of the chest and abdomen. In the lungs a continual exchange of gases goes on, oxygen being absorbed and carried to the tissues by the blood, and carbon dioxide being formed by the decomposition of carbonates in the blood. The proportion of carbon dioxide in the air of the lungs remains fairly constant, and this proportion can only be maintained by the inspiration of air rich in oxygen and the expiration of air with a relatively large proportion of carbon dioxide. If there is need for a larger consumption of oxygen, as during muscular exertion, the breathing becomes quicker and deeper; excess of carbon dioxide stimulates the breathing, so that the actual proportions of the gases in the air of the lungs do not alter, although the outer air be vitiated. If, however, the supply of air is so restricted or vitiated that the proportion of carbon dioxide within the lung increases, symptoms such as headache and nausea immediately present themselves, the skin takes on a blue tinge, and as the percentage increases consciousness is lost, respiration ceases altogether, and finally the heart stops beating.

The treatment in case of A. consists of first removing the cause and then resorting to artificial respiration (q.v.). If

the cause be inhalation of bad air, the patient must at once be removed to the open air, and the clothing about the neck, chest, and waist loosened. When choking is threatened through the presence of a foreign body in the air passages, an effort should immediately be made to dislodge it by means of the fingers, as there is risk of sudden A. An attack of vomiting or coughing may also succeed in ejecting the obstacle; or if a surgeon be at hand and the urgency of the symptoms demand it, laryngotomy or tracheotomy, according to the position of the obstacle, may allow air to pass to the lungs.

Asphyxiants, chemical substances which have a poisonous effect on the human system, producing suffocation. Many of them are used in the manuf. of ammunition.

Aspie, name given to the transparent, light-coloured jelly in which fish, meat, etc., are sometimes served. The jelly has a savoury flavour as it is prepared from stock flavoured with vegetables and a variety of vinegars. The liquor is cleared with egg whites and set with gelatine.

Aspidistra, small genus of Asiatic Liliaceae. It has broad leaves, and the species *A. lurida* is often grown as an indoor foliage plant in Britain.

Aspidium, genus of ferns now reclassified botanically among genera *Dryopteris*, *Polystichum*, *Nephrolepis*, and *Tectaria*.

Aspinwall, William H. (1807-75), Amer. railway builder, b. New York; in 1837 a partner in the shipping firm of Howland & A. In 1850 he left this to construct the Panama railway across the isthmus. It was completed in 1855, and the E. terminus was named after him. He was one of the founders of the Pacific Mail Steamship Co.

Aspinwall, see COLON.

Aspirate (Lat. *spiro*, I breathe). It denotes a sharply defined audible breath, and as such signifies in Eng. grammar the letter *h*. In Greek the *spiritus asper*, or rough breathing mark, when placed over an initial vowel has the effect of prefixing an *h* in the reading or pronouncing of the word. The A. is also used in application to 2 classes of consonants, i.e. those blended with *h*, as in the Sanskrit, and those followed by *h* in English in examples like *th* and *ch* with *f* and *v*. Thus, in the latter and broader sense of the term, 8 of the 16 Eng. mute sounds are *lene*, i.e. possess their corresponding aspirate.

Aspirator, apparatus used for drawing air or other gases through vessels connected with it. The simplest form consists of a large bottle filled with water, and supplied with a stopcock at the bottom. The apparatus through which the gas is to be drawn is connected with the neck of the bottle and the stopcock is opened. As the water flows out of the bottle, air or gas flows in to take its place through the only available channel, that is through the apparatus connected with the A.

Another form of A. consists of a narrow tube connected with a supply of water

under pressure. This jet is surrounded by another tube closed at the top and connected laterally with the vessel from which the air is to be withdrawn. Air is carried down with the jet so that a continuous current is set up from the vessel to be exhausted.

Aspirin, trade name for acetylsalicylic acid, $C_9H_8O_4$. It is also known as acidum and acetosalicum or salaceticin, and is made through the action of acetic anhydride on salicylic acid. Though first introduced into medicine under the name of A., it has many other trade names, e.g. Genasprin and Aspro. The dose is from 5 to 15 grains, and it is prescribed for rheumatic fever to reduce temp., and is widely used for neuralgia and headaches. It has the same action as salicylic acid, but is not so prone to produce secondary effects such as gastric disturbance. Care is to be taken to avoid exposure after administration, as perspiration often follows the dose.

Aspland, Robert (1782-1845), Unitarian divine. He was originally intended for the Baptist ministry, but was expelled from that body in 1800 for 'unsoundness,' and entered business, doing 'supply' preaching on Sundays. In 1801 he became minister to the General Baptist church at Newport, Isle of Wight; in 1805 he went to Norton, Derbyshire, and later in that year began his 40 years' ministry at the Gravel Pit Chapel, Hackney. He estab. sev. Unitarian periodicals, was secretary to numerous denominational societies, and in 1812 founded the Hackney Academy at Durham House for the training of Unitarian preachers. He was chiefly responsible for the formation of the Brit. and Foreign Unitarian Association in 1825. See *Memoirs* by R. Brook A., 1850.

Asplenium, genus of ferns of the family Polypodiaceae, commonly known as spleenworts, and having medicinal properties. *A. trichomanes* is the maidenhair spleenwort; *A. adiantum-nigrum*, the black spleenwort; *A. viride*, the green spleenwort; *A. ruta-muraria*, the wall rue, grows on rocks and old walls. *A. bulbiferum* is curious on account of the young plants which grow on its leaves; *A. rhizophyllum*, the walking fern, roots at its leaf-tips when bent to the ground; *A. nidus*, the bird's-nest fern, is a beautiful tropical plant.

Asplund, Gunnar (1885-1940), Swedish architect, b. Stockholm; prof. of architecture there 1931-40. Prin. buildings designed by him: extensions of the law courts, the railway station, the public library, the Skandia cinema, the exhibition, and the crematorium—all in Stockholm; extensions of the tn hall at Gothenburg; numerous schools.

Aspromonte, mt. of Calabria (q.v.), Italy. It is situated at the W. extremity of the range of the Sila Mts and rises just behind the peak of Reggio di Calabria. Its slopes are forest clad, and its height 6420 ft. It was the scene of Garibaldi's (q.v.) arrest in 1862.

Aspropotamos, see ACHELOUS.

Aspuzo, see MALATYA.

Asquith, Herbert Henry, see OXFORD AND ASQUITH, FIRST EARL OF.

Asquith, Lady, see OXFORD AND ASQUITH, COUNTESS OF.

Ass, general name for the braying members of the horse genus (*Equus*). It differs somewhat from the horse in having a tuft of hair at the end of its tail, in having no warts on its hind legs, and in the presence of stripes, which are absent in the domestic A. Its characteristics are long ears and an upright mane, together with a proverbial stupidity. The Egyptians used the head of an A. to signify the sign of extreme dullness. It is only fair to add on behalf of the A. that this celebrated stupidity is more superstitious than actual. Although the domestication of the A. took place at a very early date, the common 'donkey' was not introduced into England till the time of Elizabeth I. The animal is particularly adapted for transport purposes on account of its surprising hardihood, endurance, and docility when treated kindly. The usually wretched specimens seen in England are more the result of bad treatment than naturally so. In Arabia, Syria, and Egypt, among other places, its careful treatment has resulted in the evolution of an animal of remarkable value, and a Sp. he-ass was worth £200 in 1939. The wild variety is much hunted in Persia, and its flesh greatly prized. Because of the presence of more sugar and less cheese in its milk, invalids take it with benefit. Its skin is manu. into shagreen leather, and also used in the making of drums. The variety called albino, i.e. white, was used by the ancients on state occasions, and reserved for the highly honoured. Wild A.s are found in Asia and Africa, the former being more horse-like. The largest and handsomest is the Kiang (*Equus kiang*) from Tibet.

Assab Bay, situated on the W. coast of the Red Sea. Formerly an It. trading station; in 1880 it was taken over by the It. Gov. from a private company and used as a coaling station. There is a good harbour and a lighthouse. Harbour extensions have been planned and a possible rail route to connect with the railway from Jibuti to Addis Ababa. 378 ships totalling 411,124 tons used the harbour, 1953-4: unloading 37,636 tons and loading 99,869 tons.

Assai, beverage much in favour with Brazilians. It is made by soaking in water the fruit of the *Kuterpe edulis*, or A. palm. The concoction is said to be very nutritious.

Assal, or **Bahr Assal**, extensive salt lake of Fr. Somaliland. It is nearly 600 ft below sea level. Caravans call there to gather the salt that thickly encrusts its shores.

Assam, state of India covering much of the Brahmaputra Valley and the hills to the N., bounded on the N. by Bhutan and Tibet, on the E. by Burma and Manipur, on the W. and S. by E. Pakistan and Tripura. A. has 3 distinct regions—the A. or Brahmaputra Valley (an extension of the Indo-Gangetic trough); the Surna-Barak Valley; and the highlands. A.

has a phenomenal rainfall, its problem being not irrigation but flood control. Cherrapunji in the Khasi Hills, called the world's wettest spot, gets 428 in. of rain yearly; in 1861 it had 905 in. (41 in. on one day). A. is also subject to severe earthquakes.

History. The A. Valley, 400 m. long and mostly under 50 m. wide, with much of its area taken up by jungle and the wide sprawling riv., has a hist. of its own. Its people have always been subject to incursions from all sides. The Ahoms, who give the valley its name, came from the E. in the 13th cent. and were always at war with Muslims from Bengal. Later Burmese incursions terrorised A. so much that the British occupied it in 1825, making it part of Bengal and later a Chief Commissioner's prov. It became a separate prov. in 1919. It prospered with the growth of plantations, especially tea, introduced by the E. India Company in 1835. In 1944 A. was a theatre of war when the Japanese entered the Tiddim area, Kohima, and Imphal in Manipur. For the story of their repulse see BURMA, SECOND WORLD WAR CAMPAIGNS.

Development. The valleys are fertile; main food crops are rice, mustard, sugar, potatoes, fruit. Plantation crops for export are tea (A. has half of India's acreage under tea), jute, and cotton. Forests are a big potential asset, yielding increasingly teak, sal, rubber, lacquer, and elephant ivory. A. has a considerable oilfield at Digboi (65-80 million gallons a year), and a coalfield. Riv. steamers carry much of A.'s trade. Roads and air links, to connect A. with India without entering E. Pakistan, are being developed. The war stimulated exploitation of resources and road building, but A. has much undeveloped land and water potential, and little of the pop. pressure general in India.

Culture. A. is distinct from India, many of its people (33 per cent) belonging to tribes in the hills, some very primitive and some in conditions similar to Burma. Assamese is the tongue of 55 per cent of A.'s people—it is akin to Bengali. The pop. has changed its composition since plantation labour entered from Bihar and S. India. A.'s first univ. was estab. at Gauhati in 1948.

Government. The governor has a council of ministers, who are responsible to an assembly of 108 members. In India's Parliament A. has 7 members in the Upper and 12 in the Lower House. The cap. is Shillong (pop. 54,000); Gauhati (pop. 75,000) is the univ. tn and former cap. Area 84,924 sq. m.; pop. 9 million.

Assandun, see ASHINGDON.

Assary, see AS.

Assas, Louis, Chevalier d' (1733-60), Fr. hero, b. Vigan. He joined the army and reached the rank of capt. in the regiment of Auvergne. The story runs that, on the night of 15 Oct. 1760, he entered a wood to reconnoitre, and was surrounded by the enemy, who warned him that if he spoke a word he would be killed immediately. Thereupon he uttered his

famous cry, still quoted frequently, 'À moi, Auvergne, ce sont les ennemis!' The truth of the story has been questioned by historians in modern times, but the legend remains popular in France.

Assassin, term applied to one who murders another by surprise or by some secret means or treachery. The word is derived from *hashish*, the opiate made from the juice of hemp leaves. It was originally the name for a sect of the Shiites, known otherwise as Ismailites, founded by Hassan ibn Sabbah in the 11th cent. Till the 13th cent. the sect was in a flourishing state, when the Mongols under Hulagu destroyed its power. Hassan captured by a ruse the fortress of Alamut in Persia and settled there as chief of the society afterwards called the A.s. The doctrines of the A.s were those of the Ismailites, with the additional custom of the secret removal of all their enemies. At the head was Hassan ibn Sabbah, now known as Sheikh al Jabel, who was assisted by 3 grand priors. Beneath these were the semi-initiated members, and last the actual agents of assassination, who were called *fedais*, meaning devoted ones. They worked in absolute ignorance of the objects and rites of the society, and from them was exacted the most implicit obedience. One of the first victims was Hassan's former friend, Nizam-al-Mulk, followed shortly by the murder of the Shah Malik. Shah Malik's successor fought against the A.s unsuccessfully. It is said that no precautionary measures ever seemed to avail against the machinations of the society, which transferred its centre of operations to Syria in the 12th cent. A massacre of 12,000 of the A.s in 1255 by order of the Tartar khan, and a subsequent ravaging of their country by Bibars, the Mameluke Sultan of Egypt, completely destroyed their power.

The application of the word **assassination** is now generally limited to the taking of the life of a public personage for the motive purely of destroying his life. During the 16th and 17th cents. political assassination became prominent. During the reign of Elizabeth I many attempts were made to assassinate her. At this time political enthusiasts resorted to the most extreme methods of gaining their ends, and assassination, the very height of violence, was frequently and successfully perpetrated by these fanatics. Among the most famous victims of assassination were Julius Caesar, 44 BC; Thomas Becket, 1170; David Rizzio, 1566; Lord Darnley, 1567; William of Orange, 1584; Wallenstein, 1634; Marat, 1793; Paul, Tsar of Russia, 1801. Three presidents of the U.S.A. have been assassinated: Abraham Lincoln in 1865, James A. Garfield in 1881, and William McKinley in 1901. Ex-President Theodore Roosevelt was shot in 1912, but escaped serious injury. An unsuccessful assassination plot in 1696 was organised for the contemplated murder of William III by the Jacobites. More recent assassinations include those of Carnot, Fr. president, 1894; Humbert I, King of

Italy, 1900; Carlos I, King of Portugal, and his elder son, the Crown Prince, 1908; Nicholas II, Tsar of Russia, his wife and children, 1918; Paul Doumer, Fr. president, 1932; Alexander I, King of Yugoslavia, and M. Barthou, Fr. Foreign Minister (at Marseilles), 1934; Adm. Darlan, 1942; Mahatma Gandhi, 1948; King Abdullah of Jordan, 1952. Of unsuccessful attempts at assassination there are examples without number, and the causes which have actuated them are chiefly political distortion or personal animosity. There is not space enough here to recount a list of attempted assassinations, but among the most important during recent years are those committed upon Alfonso XI of Spain, 1878 and 1879; Amadeus of Spain, 1872; Bismarck, 1866 and 1874; Francis Joseph of Austria, 1853; George III of England, 1786 and 1800; George IV, while regent, 1817; Humbert I of Italy, 1878; Isabella II of Spain, 1847, 1852, 1856; Louis Philippe—no less than 6 attempts during 1835–46; Lord Lytton, 1878; Napoleon I, 1800; Napoleon III, 1855 (twice); Queen Victoria, 1840, 1842 (May and July), 1849, and 1882; William I of Germany, 1861, 1875, 1878; Theodore Roosevelt, 1912; Mussolini, 1925, and thrice in 1926; Franklin D. Roosevelt, 1933; Venizelos, 1933; Hitler, 1944; Harry S. Truman, 1950.

Assault in the narrow legal sense is a threat to inflict unlawful force upon another. Mere words, however threatening, unaccompanied by an act of violence do not constitute an A. The person threatened must reasonably apprehend the application of force on his person. Thus, to present a gun at a person within firing distance, to throw a missile or to shake a fist at him within striking distance, to attempt to kiss a woman against her will, to incite a dog to attack a person, are all forms of common A. The term A. is often used to denote *battery*, which is the actual unlawful application of force to the body of another. An A. usually but not necessarily precedes a battery, e.g. an unexpected blow struck from behind would only be a battery. A person assaulted may use such force as is reasonable to end the A., but must not seek revenge. Scots law seeks to discover which person was struck the first blow in a breach of the peace and allows him a greater measure of retaliation than does Eng. law, provided it does not exceed just resentment. A person assaulted may prosecute in the criminal courts and/or sue for damages in the civil courts. A defendant acquitted of a charge of common A. may obtain from the magistrates who tried him a certificate protecting him from civil proceedings. Before seeking damages for trespass to his person, a person assaulted should prosecute for A. and battery. In criminal proceedings A.s are either common or aggravated. The former is a misdemeanour punishable in the magistrates' court by a fine of £5 or 2 months' imprisonment and at the assizes by a maximum of 1 year's imprisonment. Aggravated A.s have been

defined by a number of statutes and include: indecent A.s on women; A.s on children; A.s on police and other public officials, including the clergy, in the execution of their duty; A.s causing actual bodily harm. These aggravated A.s are often classed as felonies punishable with imprisonment. The Scots law has no div. between A. and A. and battery.

Assaye, vil. of Hyderabad in S. India. It is celebrated as the scene of a battle between the combined Mahratta forces and the British under Wellesley, afterwards Duke of Wellington, in 1803. It resulted in a complete victory for the British.

Assaying, chemical process the object of which is the determination of the amounts of certain metals in an ore or alloy. The methods used fall into 2 classes, dry and wet. In a dry assay the ore is reduced by fusion with suitable fluxes, so that the metal is recovered in a pure state. Wet methods are those in which by the action of certain reagents a solution of a salt of the metal is first obtained. The salt may be precipitated and weighed, or the strength of the solution may be determined by observation of the amount required to bring about a certain reaction with a standard solution of known strength. The composition of the salt being known by analysis, a simple calculation will determine the amount of the metal present.

The results of A. processes are dependent for their accuracy on the perfection of the balance used to estimate the different weights of the metals, which should be so constructed as to reveal the most minute differences in weight.

Before proceeding with an assay, it is necessary to obtain a true sample of the material: that is to say, a sample which is likely to contain the same proportions of its constituents as exist in the whole bulk of the material. There are various devices for accomplishing this, the usual method being the div. of a large supply of material into 2 unequal parts, the smaller part being subdivided and so on until a sample of convenient size is obtained. In the case of alloys in a solid state, holes are drilled right through the metal in different places, and the drillings taken for testing.

It is important to determine the amount of moisture in an ore. The simplest method is to heat a sample in an air-oven to a temp. of less than 100° C., when the loss of weight when the mass is quite dry indicates the weight of water in the sample.

The principle upon which the A. of gold and silver by cupellation depends is that all metals with which those precious metals are usually alloyed are convertible into oxides by exposure to atmospheric air at a high temp., whereas the precious metals themselves remain unacted upon.

The general methods of A. as applied to particular ores, etc. are seen in the following examples:

Lead. The dry assay of galena, or lead sulphide, is carried out by mixing

the ore with a flux consisting of sodium carbonate and borax. The mixture is heated in a clay crucible at a red heat for about 20 min. and the fused material poured out. The lead button generally contains impurities, such as silver, antimony, and copper, so that its weight gives too high a percentage. The percentage of lead can also be gravimetrically determined by the formation of the sulphate. The ore is first dissolved in nitric acid, to which sulphuric acid is afterwards added. The excess of acid is removed by evaporation, and a precipitate of lead sulphate remains. This is washed with water to remove the iron and copper salts, and the insoluble matter is treated with dilute sulphuric acid. After filtering, the solid portion is treated with hot alkaline ammonium acetate to dissolve the lead sulphate. After again filtering, the filtrate is treated with alcohol and sulphuric acid to re-precipitate the lead sulphate, which is then filtered, again washed with strong alcohol, and weighed. When, as is sometimes the case, the carbonate or white lead ore is found in considerable quantities, the process is similar, but a different flux is used.

Copper. The percentage of metallic copper in an ore may be determined by electrolysis. The ore is treated with nitric and sulphuric acids until all the copper salts are dissolved, when the solution is freely diluted and submitted to electrolysis in a glass vessel with platinum electrodes, the copper being deposited on the negative electrode. The process is somewhat lengthy, but gives fairly accurate results. The potassium cyanide wet method depends on the fact that when potassium cyanide is added to a copper salt which has been rendered blue by the addition of ammonia, the colour gradually disappears. The ore is treated with nitric and sulphuric acids and then heated until the nitric acid is evaporated. The pure copper may be obtained from the solution by placing a small piece of aluminium foil in the solution. The copper is soon precipitated and sulphuric acid is added to dissolve the aluminium. The solid portion is washed and then treated with nitric acid, which dissolves the copper. Ammonia is added to the filtrate until it is just blue. The strength may then be estimated by adding the standard solution until the blue colour vanishes. This method is only satisfactory if small amounts of copper are present.

Zinc. Dry methods are not used, owing to the difficulty in separating the pure zinc from the other metals found in the ores. The chief volumetric method depends on the reaction between zinc chloride and potassium ferrocyanide, zinc ferrocyanide and potassium chloride being formed. The ore is treated with a mixture of potassium nitrate and nitric acid, and a strong solution of potassium chlorate in nitric acid is afterwards added and the mass evaporated to dryness; sodium hydroxide and sodium carbonate are added and the mixture is filtered, after which the filtrate is treated with

excess of hydrochloric acid. Any copper present is precipitated by passing sulphuretted hydrogen into the solution, after which the standard solution of potassium ferrocyanide is added. The end of the reaction is determined by testing a small drop of the solution with uranium nitrate. The appearance of a brown tint announces the presence of potassium ferrocyanide in excess.

Silver. In what is called the scorification assay, the ore is mixed with an excess of lead and heated in a scorifier or clay dish. The silver compounds are decomposed, the silver forming an alloy with the lead, and part of the lead oxidising and combining with the other constituents of the ore. The metallic button produced therefore contains a small part of the lead used and all the silver. This alloy is then cupelled. Cupels are small vessels moulded out of bone ash, which has the property of absorbing molten litharge or lead oxide, whilst the metallic portion is unaffected. The temp. used is just below the melting-point of silver until just before the process is complete, when it is suddenly raised. The result is that the lead is oxidised and thus separated from the silver. The assays are slowly cooled so as to avoid 'spitting' of the silver button.

Gold, when the alloy consists of copper, is assayed by the same method as is used for silver, and any silver present is removed by the action of strong nitric acid, the metal being previously rolled into a thin plate, so that every part of it may be reached by the acid. When the alloy consists of silver the process is called parting. Generally, however, both processes have to be resorted to. Amalgamation with mercury is also resorted to when gold has to be separated from sand, gravel, etc.

Iron. Dry methods are almost obsolete, and wet methods are all based on the readiness with which ferrous salts can be oxidised to ferric salts, or ferric compounds reduced to the ferrous condition. A standard method is the addition of potassium dichromate to an acid solution containing iron in a ferrous state. The ferrous salt is oxidised and the colour changes to green owing to the formation of a chromium salt. The indicator used is diphenylamine or sodium or barium diphenylamine sulphonate in the presence of syrupy phosphoric acid. At the end point the colour becomes purple. Another method utilises standard potassium permanganate, which is its own indicator in the presence of sulphuric acid, the end point being the production of a faint but permanent pink colour. The amount of the standard solution of potassium dichromate or potassium permanganate used determines the strength of the solution of the ferrous salt.

Asse (previously **Assche**), tn in the prov. of Brabant, Belgium, 9 m. NW. of Brussels. Pop. 11,700.

Assagai, or **Assagai**, weapon for throwing, usually a light spear made of wood and tipped with iron. It is used by all

the Bantu peoples of Africa. There are the long and short A.s.

Assemani, **Giuseppe Simone** (1687-1768), member of a famous family of Syrian orientalist. He was educ. at the Maronite College in Rome, and was later transferred to the Vatican Library, and afterwards made archbishop in *partibus* of Tyre. The Pope sent him on an expedition to Egypt and Syria in search of valuable MSS. He ed. and pub. rev. of the most valuable oriental MSS. of the Vatican.

Assembly, Church, see CHURCH ASSEMBLY.

Assembly, General, of Scotland, see GENERAL ASSEMBLY.

Assembly, National, see NATIONAL ASSEMBLY.

Assembly of Divines, see WESTMINSTER ASSEMBLY OF DIVINES.

Assen, cap. of the prov. of Drenthe, Netherlands, 16 m. S. of Groningen. Peat-cutting is the chief industry. Pop. 26,300.

Assent, Royal. When a Bill has passed through both Houses of Parliament in the same session it does not become an Act, or the law of the land, until the sovereign has signified his or her consent, such consent being known as the R. A. The Parliament Act, 1949, provides that where a Bill has passed the Commons twice in 2 successive sessions, such a Bill may be presented direct to the sovereign for his or her A. even if the Lords refuse to agree to its passage. The R. A. is sometimes given by the sovereign in person but more often by lords commissioners representing him, the power to do this being conferred by 33 Henry VIII, c. 21. The commissioners are usually 3 or 4 of the great officers of the state, and they hold letters patent under the great seal, signed by the sovereign's hand. They or the sovereign signify the R. A. in the House of Lords, but the Commons are also present at the bar, to which they are summoned by the black rod, and to which they repair headed by the Speaker, the ministers, and the officers of the House. The A. is given in Norman-French in the following picturesque fashion. After the title of the Bill is read by the clerk of the Crown, the clerk of the Parliament says 'Le Roy (or, La Reine) le veut.' An expression of thanks for the 'benevolence' of 'ses bons sujets' is coupled to the A. to a money Bill, and there is yet another formula for assenting to a private Bill. Should the king refuse his assent to a Bill, the form of announcement is 'Le Roy s'avisera' (the king will consider it). But as the sovereign can now act only on the advice of his ministers, i.e. the Cabinet, this contingency never arises. The last instance in which the R. A. was refused was by Queen Anne in 1707, when she refused her A. to a Scotch militia Bill, but in former times the refusal of the R. A. was a common enough occurrence. Queen Elizabeth I once at the end of a session refused to assent to 48 Bills out of a total of 91 presented to her. In 1858, says Prof. Lowell, Queen Victoria

was nearly advised by ministers to veto a private Bill obtained by the Pinilco Co. because the House of Lords had not permitted the Board of Trade to appear and oppose something which it ought to have opposed before the Private Bill Committee. Unless it is stated to the contrary in the body of a Bill, a Bill becomes the law of the land and its operation commences from the day it has received the R. A. A bill to abolish the use of French in all proceedings in Parliament and courts of justice was passed by the House of Lords in 1706 but was dropped in the House of Commons, so that French is still used for the R. A., although it was enacted in 1731 that all proceedings in courts of justice should be in English.

Asser, or *Asserius Menevensis* (d. c. 910), monk of St David's, b. Pembrokeshire. King Alfred made him his preceptor and companion, and promoted him as Bishop of Sherborne. In 1572 his life of Alfred, *De rebus gestis Aelfredi Magni*, was pub. by Archbishop Parker. There is an ed. by W. H. Stevenson, 1904.

Assessment in its fiscal sense is the fixing by the authorised assessor of the value of a property or income for the purpose of taxation or judicial award. See COSTS; DAMAGES; RATES AND RATING; TAXATION.

Assessor. The word is derived from the Lat. *adessor*, one who sits beside another, and signified one who was learned in the law and sat by a magistrate or other functionary, such as a governor of a prov., to aid him in the discharge of the judicial duties of his office. In modern times the word has been applied in a similar sense to one who, having a special technical knowledge, assists a judge to arrive at a decision, though having, of course, no part in the judgment. The Judicature Act, 1873, provided for their employment in all High Court cases, and the Appellate Jurisdiction Act, 1876, empowered the Judicial Committee of the Privy Council to obtain the help of the archbishops and bishops in eccles. causes. In maritime causes particularly A.s are frequently employed, such A.s generally being Trinity Brethren. The power to employ A.s in hearing appeals from the Admiralty Court was conferred on the House of Lords by the Supreme Court of Judicature Act, 1891, and under the Patents Act, 1883, either party in an action for infringement of patent is entitled to demand that the case be heard with an A. The Clergy Discipline Acts require that the bishop inquiring into the case should be assisted by 3 A.s, one of whom must be a barrister and another being generally his chancellor. Apart from eccles. and maritime causes, the help of judicial A.s is not often resorted to, their functions having long since been performed by expert witnesses.

Assets, in ordinary commercial parlance, implies any property or stock-in-trade of a merchant or company, and the term in this sense is used generally in relation to bankruptcy and insolvency. The more strict and legal application of the term (which is derived from the

Norman-French *assetz*, meaning 'enough') is to the real and personal property of a deceased person, which, in the hands of either his heir, devisee, executor, or administrator, is chargeable with the payment of his debts and legacies. Strictly speaking, therefore, the term does not apply to an intestate person's estate or to the estate of a person who dies with no debts to be paid. A. are either *personal* or *real*. The former comprehend goods, chattels, and debts, whilst the latter include real estate (i.e. landed property), whether it descends or is devised to the heir-at-law. Both classes, by the operation of the Land Transfer Act, 1897, now devolve on the executor or administrator in the first place. A. are also divided into *legal* and *equitable* A., a distinction derived from the nature of the claim of the creditors on the heir or administrators of the estate. 'Specialty' creditors, i.e. those whose debts arose from a sealed instrument or bond, were formerly entitled to payment before those whose debts were in the nature of a simple contract, but this privilege has been abolished, and both classes of creditors now rank *pari passu*. The first charge upon a deceased's estate is the expenses of the funeral and the expenses involved in administering the estate. The next charges, if they are legal A., are those which have statutory priority, such as unpaid taxes, rates, judgments of the courts, etc. Next come ordinary creditors, and finally voluntary obligations. In equitable A., however, the executor must pay whomsoever first obtains a judgment for his debt: he cannot plead that he must keep back any part of the A. to meet other creditors' demands. When all the A. have been expended to meet the demands of various creditors and there are still creditors after the estate is exhausted, the administrator is entitled to protect himself by the plea of *plene administravit*, i.e. that he has fully administered the estate. When this plea is put forward the creditor is awarded a judgment of A.s in *future*, meaning that he shall be paid out of any A. that may accrue to the defendant. In Scotland, although the word is used in the general sense of property, there is no legal term A. For administration of a bankrupt's A., see BANKRUPTCY.

Assheton, William (1641-1711), Eng. divine, b. Lancs. He became rector of Beckenham, Kent, in 1676. He was a voluminous if prejudiced and superstitious writer, as is shown in his work, *The Possibility of Apparitions*. His works include *Toleration Disapproved*, *Danger of Hypocrite*, and *The Certainty and Eternity of Hell Torments*. His scheme of insurance for the clergy may be said to be the forerunner of present-day life insurance methods.

Assideans, see CHASSIDIM.

Assiento, or *Asiento*, from the Spanish, contract or convention between the King of Spain and other powers for supplying slaves for the Sp. dominions in America. A similar treaty was entered into by Charles V with the Flemings, the

first of its kind. Similar agreements were concluded with the Genoese, Fr. Guinea Co., and England. Out of the disagreement over the A. between England and Spain concerning privileges granted to the S. Sea Co. arose the war of 1739. In 1748 4 years still were due to lapse, but at a cost of £100,000 the British abandoned the A.

Assignment, see ASSIGNMENT.

Assignats and Mandats. A. were bonds issued by the Constituent Assembly during the Fr. Revolution on the security of the confiscated landed property of the clergy. These bonds were called A., as they represented land assigned to the holders of these bonds. The first issue of the bonds amounted to 400 million francs (£16,000,000), and was generally in notes of 100 francs (24) each, though many of them were for lower sums. The object in issuing A. was not only to obtain the full value of the confiscated lands, but also to supply the deficiency of coin in circulation. Shortly after the first issue another 800 million in addition were issued, but without the liability to pay interest. At the beginning of 1791, the Legislative Assembly sequestered for the benefit of the state the property of all the wealthy *émigrés*, and in due course the Crown estates. On these more A. were issued, and by Sept. 1792 the total amount issued was by a fresh issue of 200 million brought up to 2700 million. Towards the end of this year, the double effects of the general insecurity of property and person, and of the depreciation of A. caused by their over-issue, caused a general rise in prices, with its natural concomitant, distress and pillage of shops. To counteract this distress the most extreme measures were taken by Convention, and laws fixing a maximum price to bread and other necessaries of life were enacted. Refusal of the A. was made punishable by death, but even this was not sufficient to ensure acceptance of a depreciated currency. In Aug. 1793 there were in circulation 3776 million A.; but by a forced loan of 1000 million, and by the collection of a year's taxes, this amount was reduced to less than two-thirds. Later the wants of the gov. led to a fresh issue of A. Eventually the enormous sum of 45,500 million francs in face value was in circulation, and the value of A. sank almost to nil, and early in 1796 a louis d'or (24 francs) was considered worth 7200 francs in A.

Under the Directory recourse was had to a new kind of paper-money, the mandat. These mandates were to enable any person who was willing to pay the estimated value of any of the national lands to enter into possession. They furnished, therefore, a somewhat better security than the A., as they could only be offered in payment at sales by auction. The estimate of the value of the lands was that of 1790, and in many cases this had considerably depreciated by 1795. The mandat of 100 francs at its first issue was worth only 16 francs in silver, and soon fell to a seventieth of its nominal value. The gov. were soon

forced to abandon the mandates and declare that they should be received only in payment of taxes and for land. The last issue of paper-money was in 1797, and from then to the outbreak of the First World War, 1914, the legal currency of France was purely metallic.

Assignees in Bankruptcy, person officially appointed on behalf of the creditors to manage a bankrupt's estate and now termed a *trustee*. See BANKRUPTCY.

Assignees, see ASSIGNS.

Assignment, in Eng. law, is the name given to a deed or an instrument of transfer which transfers both real and personal property. In Scots law the word *assignment* is used in conveyancing, and corresponds to the Eng. law term A., but in some instances, where statutes employing the phraseology of the Eng. law have been extended to Scotland, the word A. has necessarily obtained a partially technical use. Thus property in copyright, patents, registered vessels, all of which is transferable, is in Scots law also referred to as being assignable. The prin. interests in land to be assigned are estates for life or for any definite period of uncertain duration, and a statute of Charles II (Statute of Frauds and Perjuries) requires such A. to be in writing. An A. differs from a lease in being a transfer of the entire interest of the lessor; whereas a lease is an estate for years taken out of a greater estate, creates the relation of landlord and tenant, and reserves to the lessor a reversion. With regard to personal property, A. of goods and chattels in possession is made by bill of sale (q.v.). According to the Eng. common law a chose in action (q.v.) is not assignable. A common example of a chose in action is the right to sue for a debt, a legacy, damages, etc., and the idea underlying the prohibition to assign these choses in action was to discourage litigation. The rigour of such a state of affairs was mitigated by the old equity courts, which, on grounds of expediency, sanctioned the transfer of such property, and even in the courts of common law the ancient principle was often evaded. Since the Judicature Act, 1873, every legal chose in action is assignable provided that the debtor be served with a notice of such A. In general it may be said that any form of property is now assignable with perfect freedom, if we except a few cases which are considered contrary to public policy, such as the A. of pensions and the salaries of civil servants. Mortgages can be, and frequently are, assigned, and bills of exchange (q.v.) are assignable on indorsement.

It follows from the definition of *assignment* as the conveying of the right to a thing and not the thing itself, that in Scots law, in the case of movable property, A. can only take place when that property is in the hands of a third party. To make the transaction complete formal notice must be given the third party, and until such an intimation has been made the cedent's creditors may attach the property in the hands of the holder. This intimation is an important part of the

transfer, for though as between the parties mere knowledge of the transaction is sufficient, in the case of a competition for preference in payment the assignation first intimated will have preference over others which may be prior in date, but of which intimation of assignation has been received later.

A. of property is void if it be with intent to defeat or delay creditors, unless the transfer is made for valuable consideration and the assignee has no reasonable grounds for suspecting fraud.

Assigns in Eng. law and **Assignees** in Scots law is the name given to the parties in whose favour a deed of assignment or assignation is made or property assigned.

Assiniboia, name previously applied to 2 dists. of Canada, but now not held by either. The derivation of the word

stands on a foothill of the Apennines, overlooking the valley of the Tiber (q.v.). It is famous as the bp. of St Francis (q.v.), who founded here in 1209 the order of friars which bears his name (*see* FRANCISCANS). The first Chapter General of the order was held at the 'Portiuncula' 3 m. SW. of the tn, where the basilica of Santa Maria degli Angeli now stands; here St Francis is said to have d., and here is his original oratory. In A. itself is the great friary of San Francesco, which has two splendid Gothic churches (13th cent.) containing, amongst other works of art, frescoes by Cimabue and Giotto (qq.v.). The medieval windows are particularly fine. Beneath, in a crypt, is the tomb of the saint. A. has also a 13th-cent. cathedral, a castle, and sev. palaces. The church of Santa Chiara



E.N.A.

ASSISI: THE UPPER AND LOWER CHURCHES OF ST FRANCIS

is from the Ojibway *assini*, meaning stone, and the termination meaning to cook. The first dist. was formed in 1835 by the Hudson's Bay Co., and ceased to exist in 1870 on the transference of Rupert's Land to Canada. The second region was created by Act of Parliament in 1882 as a provisional dist. within the N-W. Ters., becoming part of the prov. of Saskatchewan in 1905. The name is perpetuated in a tn (pop. 2012) and an electoral dist.

Assiniboine, riv. of Canada, rising in 51° 40' N. lat. and 105° E. long., and joining the Red R. at Winnipeg. Its course measures about 400 m., and its tribs. are the Little Souris, Qu'Appelle, Rapid R., White Sand R., and Beaver Creek. A tribe of Indians takes its name from the riv. Steam communication existed between Winnipeg and Fort Pelly, about 400 m. distant, during the period of settlement in the late 19th cent.

Assinie, seaport at mouth of A. R. in the Fr. colony of the Ivory Coast. Exports groundnuts. Pop. 700.

Assisi (anc't *Assisium*). It. tn in Umbria (q.v.), 13 m. ESE. of Perugia (q.v.). It

(1260) contains the body of St Clare (q.v.), foundress of the order of Poor Clares. The tn is much frequented by pilgrims, and has had a considerable influence on the hist. of It. art. Metastasio (q.v.) was b. here, and so, probably, was Propertius (q.v.). Pop. (tn) 9100; (com.) 21,900.

Assize. This word, like so many other legal terms, came into the Eng. language from the Latin via the Norman-French. It is derived from the O.F. *assis*, and comes ultimately from the Latin *assideo*, to sit by. It is possible that the word A., where it signifies an ordinance, a decree, or an assessment (in which sense it is derived from another Lat. word, *assido*, to assess, fix, or ordain), may in anc't times have been confused with the former word. In the latter sense the word was used for sev. ordinances, chief among which are those known as A. of Bread and Ale, the A. of Clarendon, 1166, and the A. of Northampton, 1176. By the first the price of bread, ale, fuel, and other necessities of life was fixed. The A. of Clarendon was an important ordinance of Henry II reforming the administration of justice; it contained the beginning of

the system of trial by jury. The A. of Northampton still further removed administrative machinery from the control of the barons. The A. of Jerusalem were a code of feudal laws formed in 1099 for the new Christian kingdom of Jerusalem founded by the Crusaders.

The most common connotation of the term A., and that in which it is almost exclusively used at the present day, is that which denotes the session of High Court judges held periodically in each of the cos. of England and Wales. Their origin is to be found in articles 22 and 23 of Magna Carta, which provided that judges should visit each co. to take A.s of *novel disseisin* and *mort d'ancestor* (abolished in 1835), i.e. to settle disputes about the possession of land. Prior to this, by the common law, the administration of justice was confined to the judges sitting in term at Westminster and to justices in eyre (i.e. itinerant judges), whose circuits sometimes took 7 years to complete. The Statute of Westminster II, passed in the thirteenth year of Edward I, enacted that the justices should be 2 sworn judges, and that they should hold court in each shire not more than thrice a year. Since the passing of 1 William IV, c. 70, these courts have been held generally twice, but sometimes thrice, a year on a regular system, the country being divided for this purpose into *circuits* (q.v.). London and Middx do not come within the circuit system, the administration of criminal justice being at the Central Criminal Court (q.v.). Judges in the A. courts are as fully qualified to deal with all questions of law and fact as are those of the High Court, and in practice are always judges of that court. Their powers are now derived from 4 authorities: firstly, a commission of the *peace*; secondly, a commission of *oyer and terminer* (q.v.); thirdly, a commission of *jail delivery* (q.v.); and, fourthly, a commission of *nisi prius* (q.v.). The Scottish courts of judiciary are circuit courts somewhat similar in their function to the A. courts of England, but in civil causes they are practically limited to hearing appeals from the small debt courts. Only occasionally is a civil trial by jury transferred from the court of session to the court of judiciary. There are 3 circuits, N., S., and W. (the court of session being at Edinburgh in the E. of Scotland), in which courts are held twice a year, but owing to pressure of work Glasgow, Perth, Dundee, and Aberdeen have additional courts.

Assmannshausen, Ger. vil. in the *Land* of Hessen (q.v.), on the Rhine (q.v.), 18 m. W. by S. of Wiesbaden (q.v.). It is known for its wines. Pop. 2000.

Associated Press of America. This is an Amer. body, which claims to be the largest co-operative news organisation in the world, and in support of this claim points to the fact that it represents 1750 daily and Sunday newspapers in the U.S.A., has bureaus all over the world, and provides its members with 'spot' news, objectively presented. Its rival is the United Press of America.

Associated Society of Locomotive Engineers and Firemen, trade union of railway engine drivers and firemen, electric train drivers, and engine cleaners employed on the railways of the U.K. and Ireland; the great majority of the staff in these grades are its members. The society, which is the oldest of the three railway trade unions, is a party to the National Machinery of Negotiation for Railway Staff. It is in affiliation with the Trades Union Congress, the Labour party, and the International Transport Workers' Federation. The A.S.L.E. and F. believes that no change in railway organisation can affect the essentially craft nature of the work performed by the men at 'the front end.' On this basis the society founds its claim to be the appropriate trade union for railway staff employed in the line of promotion to driver or motorman.

Associates, term applied to clerks of the Crown office, who were once 'associated' with the judges of the commission of assize. They are officials of the Bench and Probate, Divorce, and Admiralty Divs. of the High Court. Their duties include keeping the records of the court, the preparation of the cause lists, attendance on the judge in court, and the entering up and delivering to the right quarter of the verdict and record of the case.

Association, Articles of, see COMPANY AND COMPANY LAW.

Association, The, league, the full name of which was 'The National Association for King William,' formed by Parliament in 1696 to protect the king against popish plots, as a result of a recent assassination plot against him.

Association Football, see FOOTBALL.

Association of Ideas, important term in the hist. of philosophical psychology, of considerably diminished importance in modern scientific psychology. Aristotle enumerated 3 principles of A.: similarity, coadjacency (or contiguity), and contrariety (or contrast). Thus the idea (or the actual experience) of a field of poppies may call up the idea of blood because it is similar in colour. The idea or the experience of a jug may call up the idea of milk because the jug and the milk have previously been experienced together either in place or in time. This is the principle of A. by contiguity in place and in time. The third principle (of contrast) was that the idea or experience of white might call up the idea of black because these ideas are opposites; later exponents of the principles of A. have, however, generally considered that such cases are better explained as particular examples of A. by contiguity.

The associationist school is the name given to those psychologists who tried to explain all processes of thought by reference to the A. of I. This school was mainly Brit., although it included the Fr. philosopher Condillac. Hobbes, Hartley, and Hume may be regarded as the founders of this school. It attained its climax in the writings of James Mill and of his son, John Stuart Mill, and it continued through Herbert Spencer and Bain.

The rise of experimental psychology in the last half of the 19th cent. caused the eclipse of the associationist school of psychology. While it is not denied that the principles of A. provide some of the more mechanical links in thought, they are no longer regarded as useful principles for the understanding of thought in its more practical applications, such as problem-solving. The weakness of Associationism was that it treated all thought as reproductive and neglected the educative (or creative) aspects of thought. It was not an accident that the Associationists very commonly took as their example of thinking the by no means typical activity of learning by heart. In solving a problem the sequence of thought is determined not by the strength of the A.s formed between the thoughts that occur but by their relevance to the needs of the problem in hand. The number most strongly associated with 33 is, no doubt, 34, but, if the problem is to multiply 33 by 3, the answer is not 34 but 99. The latter is a more typical thought process than that of learning by heart the sequence of numbers, and the succession of ideas is not to be explained by the laws of A. See articles on the writers above mentioned, and PSYCHOLOGY.

Assoilzie (O.F. *assoiler*, and Lat. *absolvere*, to absolve), term in Scots law meaning to absolve from a claim, to acquit, to pronounce not guilty.

Assonance (Lat. *ad*, to; *sonare*, to sound), correspondence of vowel sounds but not of consonants, as in 'slumber,' 'blunder'; it is illustrated in the vowel rhymes of this stanza from *The Spanish Gipsy*, by George Eliot:

Maiden, crowned with glossy blackness,
Lithe as panther forest-roaming,
Long-armed naiad, when she dances,
On a stream of ether floating.

It is a popular poetic device in the Romance languages, particularly Spanish, but not in the Teutonic, one reason being that the harsher and more discordant consonants of the Teutonic tongue have a more distorting effect upon their vowels. See also FIGURE OF SPEECH.

Assos, or **Assus**, tn on the gulf of Adramyttium (Edremid), Mysia. It is in ruins, and expeditions for the purpose of excavation have unearthed a bath, a theatre, a senate house, and 7 Christian churches. Its site is now occupied by the Turkish vil. Behram.

Assuan, see **ASWAN**.

Assumpsit (past tense of Lat. *assumo*, barbarously signifying 'I undertake'), old form of action under the common law so called because the defendant was said to have taken upon himself (*super se A.*) to pay the plaintiff so much money. It was used to recover damages for breach of a simple contract, i.e. a contract not made under seal, but in form the action was similar to an action for trespass. The action could not be sustained unless the promise to pay had been expressly made, either by an actual written instrument, such as a promissory note, or implied, as

when a householder receives goods delivered by a tradesman, or an innkeeper undertakes, by his action of receiving a traveller, the responsibility for the security of the goods of his guest. Like so many other common law forms of action, the action for A. has been superseded by such statutes as the Common Law Procedure and the Judicature Acts.

Assumption, Paraguay, see **ASUNCION**.

Assumption, Feast of, festival of the Christian Church celebrated on 15 Aug. to commemorate the taking up into heaven of the mother of Christ in body and soul, at the end of her earthly life. The earliest extant written evidence for the belief is in apocryphal writings. It was defined as a *de fide* dogma of the Rom. Catholic Church by Pope Pius XII in 1950. The festival was first instituted by the Emperor Maurice in AD 582. The Oriental Church observes it as the Feast of the Falling Asleep (Dormition) of our Lady. It still appeared as a feast of the Anglican Church in the Oxford Univ. Calendar in the 17th cent.

Assur, or **Ashur**, legendary founder of Assyria, and probably identical with the A(s)shur of Gen. x. 22, son of Shem. He gave his name to the country of Assyria and to its cap. A. was above all a god of war, and his symbol—the figure of a god in the act of shooting an arrow from the bow, enclosed in a circle—appears on Assyrian reliefs. See **ASHUR** and **ASSYRIA**.

Assur, see **ASSYRIA**.

Assur-bani-pal, see **ASHURBANIPAL**.

Assurance. This term is often applied specially to life as distinct from fire and other classes of insurance, but A. and insurance are practically identical. The term is also frequently applied to grants or conveyances of interests in land. See **INSURANCE**.

Assyat, **Loch**, freshwater lake of SW. Sutherland, Scotland. It is 215 ft above sea level, 6 m. long, and 1 m. in breadth.

Assyria (Assyrian **Assur** or **Ashur**, Persian **Athura**), anct state in Mesopotamia between the Zagros, Armenian-Taurus, the Hamrin Mts, and the Middle Euphrates. Although bounded on the N. by Urartu (Armenia) and S. by Babylonia, the ter. of A. varied, according to its political power, between the area bounded by the oldest and chief cities of Assur, Nineveh, Calah (Nimrud, q.v.), and Erbil and the whole of the tribute-paying lands at the height of its power in the 7th cent. BC. These included Babylonia, N. Arabia, Upper Egypt, Palestine, Syria, Cilicia, and S. Armenia. A. was inhab. from prehistoric times, though the origin of the Assyrians themselves is obscure. The earliest inhab. may have come from Sumer (Gen. x. 11) or the E. hills. Throughout the third millennium A. was dominated by Sumer, from whom it took over the cuneiform script, as well as religious and artistic ideas. A. was the seat of a vigorous Semitic power which displaced the Mitanni (q.v.) who had encroached upon the local kingdom of Shamshi-Adad I (c. 1750 BC). Tiglath-pileser (q.v.) I (1100 BC) and his successors extended

the influence of A. westwards to the Mediterranean during what has sometimes been called the 'First Assyrian Empire.' Adad-nirari II (911-890 BC) maintained control by a policy of transporting rebels from the subjugated lands. The most flourishing period of A. followed the refounding of Calah (Nimrud, q.v.) by Ashurnasirpal II (883-859 BC). A series of sustained military campaigns pushed the boundaries of A. to their furthest extent (for relations with the S. see BABYLONIA).

In the W. Shalmaneser (q.v.) III clashed with a coalition under Hadadezer and Hazael of Damascus, and though



British Museum

ASSYRIAN MAN-HEADED LION

checked at the battle of Qarqar in 853 BC, he received tribute from Jehu of Israel and the rulers of other city-states. Tiglath-pileser III (Pulu) developed a system of prov. gov. incorporating Damascus (732) into the Assyrian Empire. He received payment from Menahem of Israel to avoid the occupation of that land by A. forces. In 734 Tiglath-pileser captured Gaza and intervened on behalf of Judah by replacing Pekah by Hoshea on the throne at Samaria. A. also received tribute from (Jeho)ahaz. Shalmaneser V. besieged Tyre and Samaria, which fell to his successor Sargon (q.v.) II in 722 BC. Sargon II estab. a new cap., Dur-Sharrukin (Khorsabad), 10 m. N. of Nineveh, but this fell into disuse after his death in 705 BC. His son Sennacherib (q.v.) was active on the N. border but also campaigned in the W., where he unsuccessfully besieged Hezekiah in Jerusalem

after he had captured nearby Lachish (701 BC). After a long struggle with Marduk-apal-iddina II (Merodach-baladan, q.v.) he sacked Babylon. Sennacherib was an active builder and with his wife Naq'a (see SEMIRAMIS) re-planned Nineveh and was responsible for extensive irrigation works on which A. depended at all periods. Esarhaddon (q.v.) followed his father, who was murdered in 681. He invaded Egypt as far as Memphis and Thebes and subdued the hill tribes to the E., making treaties with the Medes. Although his son Ashurbanipal (q.v.) continued his father's policy, A. was already under pressure from the Medes and Scythians and weakening economically. In 648 BC Ashurbanipal sacked Babylon, which had rebelled under his brother Shamash-shum-ukin. He appointed a native, Kandalanu, to rule the S., but in 626 a Chaldaean dynasty under Nabopolassar (q.v.) gradually recovered Babylonian independence and the Assyrians withdrew. First Ashur (614) and then Nineveh (612) fell to the Babylonians and Medes, aided by Umman-manda (Scythians). For a while the last king (Ashur-uballit) reigned in Harran, but by 608 A. was controlled by Babylonia and henceforth lost its independence. With the fall of Babylon to the Medes (639) A. (with Babylonia) became a prov. of the Achaemenids, Greeks, and in turn the Seleucid, Parthian, and Sassanid empires, and eventually of the Caliphs. Throughout this later period A. was ruled from Babylon, Seleucia, Ctesiphon, and Bagdad (from AD 762). After a period of Turkish rule (1638-1917) and A. (now known as northern Iraq) was absorbed in the administrative dist. of Mosul and Erbil.

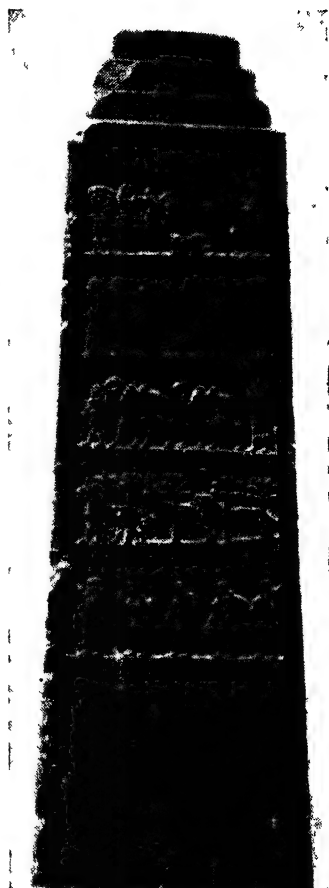
Our knowledge of A. has been growing continually following the excavations and researches at Nineveh, Ashur, and Nimrud (q.v.) conducted from 1845 to the present. The finds can be roughly classified as belonging to the realms of art and literature.

Art. From at least the time of Tukulti-Ninurta I, who built a palace at Kar-Tukulti-Ninurta near Ashur (c. 1100 BC), the kings of A. erected massive palaces of sun-dried brick with the interior decorated with painted frescoes using bright colours to outline symbolic patterns. To these were added sculptured slabs of stone depicting religious scenes such as eagle-masked priests or 'sacred trees.' Ashurnasirpal II in his NW. Palace at Nimrud, opened in 879 BC, lined the walls of the main reception rooms with reliefs on massive slabs showing his warlike operations. Across these was cut a long cuneiform inscription summarising his victories and lauding the national god Ashur. He also depicted scenes from the lion hunt and erected colossal winged bulls at the main doorways. Shalmaneser III added the artistic record of his wars on stele, on a black obelisk (showing the submission of Jehu and other kings), and on bronze gates found at Balawat, all now in the Brit.

Museum. The style of carving changed with Sennacherib, when more detail and an attempt to show perspective were crowded into the same type of warlike scene, such as his capture of Lachish. With Ashurbanipal the art of A. was at its peak, the liveliness and careful detail of the scenes from the lion hunt which decorated his palace at Nineveh being of the finest 'pre-classical' workmanship. In his reign the tendency to show non-war subjects was stronger. Excellent examples of enamelling and frescoes come from this same period. Ivory was worked to decorate thrones, couches, and other furniture and, with bronzes, has been found in large quantities, as also have jewellery and seals of fine workmanship.

Literature. The basis of the knowledge of the history of A. is thousands of documents written on stone or, more frequently, on clay. Inscribed clay prisms or cylinders mark the foundations of main buildings. Inscribed slabs, pavements, obelisks, and bricks record the royal building and war operations. These, and contemporary documents, including letters and accounts, enable a general picture of events throughout most periods of the history of A. to be reconstructed after the time of Shamshi-Adad I. However, the discovery of the Royal Library of Nineveh has done more than all else to provide detailed information of every aspect of Assyrian life and thought. Ashurbanipal was himself a scholar and sent scribes to temple libraries throughout the country to copy or collect texts of every type to add to the documents already amassed by his predecessors. The discovery of these tablets by Layard and Rassam has proved of prime importance for the development of Assyriology. About 20,000 tablets, some copies or originals going back to Sumerian times, include scientific works and cover the whole range of Assyrian learning. Medical treatises, including prescriptions and diagnosis, prognosis, and treatment of all manner of diseases; mathematics (tables of multiplication, square and cube roots, and geometric problems); laws and lists of plants, stones, cities, and objects are a tribute to the careful observation which is the first step in scientific work. These lists were also used as reference and school text-books. Other library tablets outlined grammatical forms or were dictionaries giving the Sumerian equivalents of Assyrian words, thus greatly aiding the decipherment and understanding of Sumerian which is based on these texts. Astronomical or astrological omen series, in as many as seventy tables, are supplemented by astrological reports presented to the king. Prayers and hymns addressed to the king or to the prin. gods, and numerous omens, incantations, and homerologies, reveal the religious beliefs and superstitions in the daily life of A. Perhaps the best-known Assyrian texts are the epics, which include a seven-tablet story of Creation, called after its first words, *Enuma Elish*, and the sagas of the hero Gilgamesh, a pre-Flood

King of Erech (see also GILGAMESH EPIC). The discovery of the eleventh tablet of this series by George Smith in 1872 did much to rouse popular interest in Assyriology. It was a poetic account of the Deluge, copied from texts going



British Museum
BLACK OBELISK OF SHALMANESER III

back to Sumerian originals of at least c. 1800 bc. The Flood narrative was told to Gilgamesh in response to an inquiry concerning eternal life. The unprecedented Deluge was a punishment for evil-doing; the survivor Ut-napishtim, warned by the god Ea, built an ark and took animals into it during the rains and floods which lasted seven days and caused the ark to drift northwards to Mt Nisir. On

emerging from the ark after having assured himself of the abating waters by the release of birds, the hero sacrificed to the gods and was rendered immortal. The similarities to, but not always the many differences from, the Genesis account have often been stressed.

The religion of A. was an adaptation from the Babylonian and thus ultimately of the Sumerian. It was polytheistic, the national god being *Assur* (q.v.), who absorbed most of the attributes of *Marduk* (q.v.). *Assur* was linked with a triad of deities: *Anu*, the heavenly father of the gods; *Bel*, ruler of the earth; and *Ea* (qq.v.), god of the deep and wisdom. Another triad was *Sin* (q.v.), the moon god; *Shamash*, god of the sun and universal judge; and *Adad* or *Addu*, the storm-god (formerly read Rimmon or Ramman). Other important deities were *Ishtar*, goddess of love and war (Venus); *Nabu* (q.v.), a son of Marduk, the scribe and messenger of the gods, father of learning and of the scribal arts, to whom many inscribed clay tablets are dedicated; and *Nergal* (q.v.), a solar deity, god of war, hunting, and king of the lower regions. All gods had their own symbols, shrines, and attendants. Constant appeal by prayer and incantation was made to all these gods and to the spirits which were thought to animate every object and phenomenon in nature. The principal religious festival was that of the New Year when the gods went in procession outside the cap. to the *akitu*-house where the destiny of the following year was decided by the assembled gods. The king as representative of both the gods and the people is often depicted drawing life for his people from the 'sacred tree.'

For the excavations of sites in Assyria from 1845 to the present time see the articles on the chief cities: *ASHUR*, *NINEVEH*, and *NIMRUD*, and on the excavators who have worked there: *LAYARD*; *RASSAM*; *RAWLINSON*; *LOFTUS*. See also *BABYLONIA* and *SUMER*. See A. H. Layard, *Monuments of Nineveh*, 1849, *Nineveh and its Remains*, 1849, and *Nineveh and Babylon*, 1853; A. T. Olmstead, *History of Assyria*, 1923; Sidney Smith, *Cambridge Ancient History*, vol. iii, 1925, and *Early History of Assyria*, 1928; Sir E. W. A. Budge, *Rise and Progress of Assyriology*, 1925; C. J. Gadd, *The Stones of Assyria*, 1936; S. H. Hooke, *Religion of Babylonia and Assyria*, 1953; Seton Lloyd, *Foundations in the Dust*, 1955; M. E. L. Mallowan, *Twenty-five Years of Mesopotamian Discovery*, 1956.

Assythment, in Scots law, is an obsolete form of reparation exacted when death resulted from crime and the criminal was not executed. It was also payable when the homicide was unintentional and was due even in cases of accidental death.

Ast, Georg Anton Friedrich (1778-1841), great Ger. scholar and teacher, was b. Gotha and d. Munich. He went to the univ. of Jena in 1798, where he studied philosophy and philology. In 1802 he became an academical lecturer at Jena; and in 1805 was appointed prof. of ant.

literature in the univ. of Landshut, which institution was transferred to Munich in 1812. He wrote many philosophical and philological works, and during the latter part of his life gave most of his time to the study of Plato. His *Platons Leben und Schriften* (1816) was an important work. In 1809 he began to edit separate dialogues of Plato; and from 1819 to 1832 he pub. a complete ed., with a Lat. trans. and a commentary. His *Lexicon Platonicum* was pub. 1834-9.

Asta, see **ASTI**.

Astacus, genus of decapod crustaceans. *A. serratus* is an Australian crayfish; *A. gammarus* (or *Lomarus vulgaris*) is the lobster (q.v.). An astacian is a member of the family, and an astacite is a fossil crayfish.

Astaire, Fred (1900-), Amer. dancer and actor, b. Omaha. With his sister Adèle A. he formed a brother-sister dancing team, 1907. After numerous Broadway successes the team dissolved in 1932 and a series of brilliant motion pictures in partnership with Ginger Rogers followed, of which the best known were *The Gay Divorce*, *Roberta*, and *Top Hat*. Since the dissolution of this partnership A. has had many different leading ladies, including Judy Garland (*Easter Parade*) and Audrey Hepburn (*Funny Face*). A. was given a special Academy Award for 'raising the standards of all musicals,' 1949.

Astapa, see **EESTPA**.

Astarabad, see **GORGAN**.

Astarte, **Ashtoreth** (the latter a form produced by inserting the vowels of *bosheth*, 'shame'), anct Semitic goddess of sexual passion, the Canaanite and Syrian equivalent of the Babylonian *Ishtar*, and associated (as goddess of maternity and fertility) with *Tammuz* (q.v.), or *Adonis*, who represented (like the Gk Persephone) the passage of the seasons. *Phoenicia* was the special centre of her worship (she is 'the goddess of the Sidonians' of 1 Kings x. 5); but as the consort of the local baals (see **BAAL**) she was also worshipped throughout Canaan, her image in the form of a wooden totem called the *Asherah* standing in each of the sanctuaries. W. F. Albright (*Archaeology and the Religion of Israel*, 1926) suggests that *Asherah* was originally a distinct goddess of the sea, and her name often occurs in the Ras Shamra tablets. It seems certain, however, that *Asherah* was identified with A. A.'s priests were eunuchs; temple prostitution was a regular feature of her cult, fiercely attacked in the Bible (2 Kings xxiii. 13). The fish and the dove were sacred to her. She was also a warrior goddess.

Astatic Couple, 2 magnetised needles mounted one above the other, and parallel, but with the poles reversed. If the magnetic moments of the 2 magnets are nearly identical, the couple will show little tendency to set N. and S., but will still be sensitive to a magnetic field set up by an electric current in a surrounding coil. Hence A. C.s are used in astatic galvanometers.

Astatine, symbol At, atomic number

85, a member of the halogens (q.v.). It was obtained as an artificial product of the nuclear bombardment of bismuth with α -particles of 32 million electron volts energy. Its name is from the Gk *astatos*, meaning unstable, since A. is the only member of the halogens having no stable isotope. Although a non-metal, it has a marked electropositive character. Its similarity to iodine is shown by the observation that A. concentrates in the thyroid gland of animals. There are five isotopes of atomic weights 211, 214, 215, 216, and 218.

Astbury Ware, name derived from John Astbury (1686-1743), potter, which is given to a type of red earthenware (q.v.) made in Staffordshire, of remarkable thinness, decorated with white pipe-clay stamped relief and covered with a lead-glaze, under which the body seems a dark brown. See H. Hagger, *Staffordshire Chimney Ornaments*, 1955.

Astell, Mary (1668-1731), authoress, b. Newcastle upon Tyne. Her uncle educated her in Latin, French, logic, mathematics, and natural philosophy. She finished her studies in London, and pub. in 1697 *A Serious Proposal to the Ladies, wherein a Method is offered for the Improvement of their Minds*. It advocates the estab. of a kind of Protestant nunnery.

Aster, family Compositae, genus of about 250 species, mostly perennial herbs, some shrubs and annuals, that includes species grown as Michaelmas Daisies in gardens (*A. amellus*, *A. novi-belgii*, etc.). *A. tripolium*, Sea A., is a native of Brit. coasts. The China A. is *Callistephus chinensis*.

Asterabad, see GORGAN.

Asteria, or **Asterie**, mythical daughter of the Titan Coeus and Phoebe, sister of Leto, mother of Hecate. To escape the embrace of Zeus she took the form of a quail (*ortyx*) and threw herself into the sea, where she was changed into the is. A. or Ortygia (later Delos).

Asteria, or **Star-stone**, name applied to a stone which, when cut in the form of a dome, shows a star of 6 rays. The term is specially used of an imperfect variety of sapphire, which is bluish-grey in colour and milky or opalescent. Asterism is the name given to the optical phenomenon of a star-shaped figure which is exhibited by some crystals. Asteriated sapphire gives rise to this phenomenon by reflected light, and some forms of mica by transmitted light. Asterism is also the name of any group of stars smaller than a constellation.

Asterias (Gk *astér*, star), name of a genus of starfishes, phylum Echinodermata. *A. rubens*, the 5-rayed starfish, is common in the N. Sea, *A. glacialis* in other European seas. Starfishes are found throughout the world.

Asterisk: 1. (from Gk *astér*, a star). In typography, the sign *.

2. Cover for the paten in the Eucharistic rite of the Oriental Church; made in the form of a star-cross, it supports the veil over the sacred host. One is still used in the W. by the Pope.

Asteroids, name given by Sir Wm Herschel in 1802 to what should more

properly be termed planetoids. These planetoids, now usually known as minor planets, are a numerous group of very small planets not visible to the naked eye, situated in the solar system between Mars and Jupiter. The discovery of Uranus by Herschel in 1781, which first broke through the old opinion that the number of planets was complete, and the gap between Mars and Jupiter which Bode's law (q.v.) indicated should be filled by some planet, gave an impetus to the search for a new planet, which resulted in the discovery by Piazzi at Palermo on 1 Jan. 1801 of the first and largest of the A., Ceres. On 28 Mar. of the next year Olbers at Bremen discovered Pallas; on 1 Sept. 1804 Harding of Göttingen found Juno; and on 29 Mar. 1807 Olbers found the fourth planetoid, Vesta. It was not till 8 Dec. 1845 that Hencke at Briessen discovered Astraea, and he added a sixth to the list in Hebe, found on 1 July 1847. Since that date no year has passed without the addition of some A. to the list, and at the present time over three thousand have been discovered and about sixteen hundred orbits have been computed; apparently there is no limit to their numbers.

The introduction of the photographic method by Dr Max Wolf (q.v.) in 1891, now exclusively used for detecting these bodies, has enormously accelerated their discovery. The photographic plate is fixed to a telescope worked by a mechanism which follows the apparent motion of the 'fixed stars.' If the plate be long exposed, any heavenly body with a proper motion will be detected owing to the fact that its image on the plate will be a short streak instead of a round disk. The 4 largest A. are Ceres, Pallas, Vesta, and Juno, whose diameters are respectively 480, 306, 241, and 121 m.: the diameters of the majority of the A. are considerably less than 50 m.; and Shapley and Nicholson have detected and measured one whose diameter is 3 m.; this is, therefore, the smallest planet whose dimensions have been ascertained.

The total mass of all the A. has been estimated as about 1/4000 of the mass of the earth and in any case must be less than that of Mars, for otherwise noticeable perturbations of Mars in its orbit would be detected. There appears to be no lower limit to the size of the A., a fact which indicates that they may be meteoric rather than planetary bodies. This is supported by the fact that their orbits are often very eccentric and steeply inclined to the ecliptic, e.g. that of Pallas is inclined at 35° to the ecliptic. It is significant that all A. so far discovered have direct motion, which is not favourable to a meteoric origin.

Most of the A. are fainter than the tenth magnitude, and it is surmised that they are irregular masses of rock, and no asteroid appears to possess an atmosphere.

Eros makes the nearest approach to the sun, and is of great importance for determining the solar parallax.

After the discovery of the larger A. it was suggested that they had their origins

in the breaking up of a larger planet. A later suggestion was that the A. were originally distributed in a ring round the sun (cf. Saturn's rings), and that perturbations by the planet Jupiter broke up the ring, giving rise to the present A., but it is not possible to state whether either theory is correct, and there may be some other explanation.

Asthenopia, weakness of the ciliary or external muscles of the eye or of visual power, due to over-use, errors of refraction, or incapacity for bifocal fixation owing to the deviation of one eye.

Asthma, paroxysmal affection of the bronchial tubes characterised by cough, laboured breathing, and a feeling of suffocation. *Bronchial A.* is a manifestation of an allergic sensitivity to some sensitising agent (or allergen). This may be demonstrated in many cases, and A. due to certain dusts, pollens (see HAY FEVER), animal danders, foods, bacterial proteins, and drugs, or a mixture of these, is well known. In other cases the allergen cannot be identified. Once estab. there is no doubt that attacks of A. may be conditioned by psychological influences. Thus fear of an attack can bring one on, and an asthmatic temporarily separated from means of relief may well have an attack merely because he knows he is cut off from relief. Furthermore, the feeling of suffocation in an asthmatic attack brings fear, which, in its turn, aggravates the attack and sets up a vicious circle. Needless to say, as in any condition for which there is no certain cure, the remedies for A. are legion and all have their devotees. One asthmatic will swear by one remedy, another will have no use for it. Removal from contact with the allergen is, of course, the most fruitful form of treatment, but in the nature of things this is often difficult or even impossible. Desensitising vaccines have been used with success, but not universally so. The anti-histamine drugs, by breaking the chain of the allergic reactions, have been successful in some cases. Cortisone offers relief in serious cases, but owing to dangers in its use it is not suitable for general administration. *Cardiac A.* is the name given to A. which occurs when the left ventricle of the heart fails, leading to engorgement of the lungs.

Asti: 1. Prov. of Italy, in central Piedmont (q.v.). It is generally mountainous, with foothills of the Maritime Alps (see ALPS) and the Ligurian Mts (see APENNINES), but has a fertile central plain, watered by the Tanaro, a trib. of the Po (q.v.). Area 596 sq. m.; pop. 222,000.

2. (anc. *Asta* or *Hasta*) It. tn, cap. of the prov. of A., at the confluence of the Tanaro and the Bormore, 28 m. SE. of Turin (q.v.). It is of remote origin; its pottery (examples of which are preserved in the museum) was praised by Pliny (q.v.). There are Rom. remains and many fine medieval buildings, including a Gothic cathedral. The wine of A. is famous, and there are metallurgical,

glass, chemical, and foodstuff industries. *Alfieri* (q.v.) was b. here. Pop. 53,000.

Astigl, see ECLJA.

Astigmatism, condition of the eye in which rays of light from an object are not brought to a focus at one point. It is usually due to inequality of curvature of the meridians of the cornea. This may be caused by imperfections in the lens, unequal contraction of the muscles, or a defect in the curvature of the retina. The condition is treated by the use of cylindrical glasses with the axes arranged as determined by an oculist's test. See REFRACTION, ERRORS OF.

Astilbe, genus of perennial herbs, about 12 species, family Saxifragaceae; *A. japonica* and many hybrid forms are grown in gardens.

Astley, Sir Jacob, Baron (1579-1652), Eng. soldier, a Royalist commander in the Civil war. He came from a Norfolk family and served with distinction as a soldier of fortune in the Thirty Years War. He took part in sev. Civil war battles, including those of Edgehill and Naseby. He is said to have been the author of the prayer (which he delivered before battle) 'O Lord, Thou knowest how busy I must be this day. If I forget Thee, do not Thou forget me.'

Astley, Philip (1742-1814), b. Newcastle under Lyme and d. Paris. He was well known as a horse-tamer. He began life as a cabinet-maker, but soon joined a regiment of light horse in Holland. He finally settled in London, and developed a prosperous business as circus proprietor. The estab. was known as 'Astley's.' Dickens mentions it in *The Old Curiosity Shop*. A's Royal Circus, as he called it, stood on the S. side of the Thames near the end of Westminster Bridge; the site is now covered by flats. His arena had a stage at one end, where plays were performed in which horses were largely used. This type of entertainment became known as the Equine Drama and was very popular. A's shows were without equal of their kind and he maintained a very high standard. See CIRCUS.

Astolf, Astolphus, see AISTULF.

Aston, Sir Arthur (d. 1649), Eng. general. In his youth he fought against the Turks, with Gustavus Adolphus in Germany, and in Scotland. During the Civil war he fought as a Royalist at Edgehill and defended Reading. In 1646 he fought in Ireland, and was killed by Cromwell after the capture of Drogheda.

Aston, Francis William (1877-1945), chemist and physicist, b. Harborne; educ. at Malvern and Birmingham Univ. Worked for a few years as a research chemist in a brewery. In 1910 he went to Cambridge to work under Prof. Sir J. J. Thomson, and during the First World War he was Thomson's assistant in the analysis of positive rays. In 1913 he achieved the first artificial separation of isotopes. His interest was now aroused in considering how to determine accurately the masses of atoms constituting the positive rays. But this stage in his strictly scientific work was suspended during the war period, when he worked at Farnborough on

chemical problems relating to dopes for aeroplane fabrics. Later he conceived the idea of his focusing method, on which foundation his subsequent success was built in measuring atomic masses and determining the prin. isotopes of all the permanent gases and the other elements which can be introduced into a gaseous discharge. These results induced chemists everywhere to reconsider the fundamental determinations of atomic weights, and honours soon followed: Mackenzie Davidson medal of the Röntgen Society, 1920; Hughes medal, Royal Society, 1922; Nobel prize for chem., 1922; Paterno medal, Rome, 1923. Later he constructed a new mass-spectrograph, in which the focusing of the rays was greatly improved. Final measurements of the desired accuracy were announced in 1927. A's curve of deviation from the whole number rule immediately became the basis for speculation on the structure of the atomic nucleus. In 1935 A. described researches by himself and other physicists which led to the discovery of 'heavy water,' which is used in the production of atomic energy. In 1938 he was awarded the Royal Medal of the Royal Society for his discovery of the isotopes of non-radioactive elements. Pubs. include *Isotopes*, 1922, and *Mass-spectra and Isotopes*, 1933, and numerous papers contributed to scientific magazines.

Aston Manor, see BIRMINGHAM.

Astor, John Jacob (1763-1848), Amer. merchant, b. near Heidelberg, Germany. During his early years he assisted his father, who was a butcher, later earning a living by working in his brother's musical instrument house. He emigrated to America in 1784 and settled in New York. Acting on the advice of a fur trader, he embarked on the fur trade. He gradually enlarged his business, and amassed an enormous fortune. In 1811 he founded a settlement at the mouth of Columbia R. for the purpose of establishing a central depot. It was seized by the English in 1813, an event which forms the theme of Washington Irving's *Astoria*. The A. library was given by him, and forms to-day part of the New York Public Library.

Astor, John Jacob (1864-1912), Amer. capitalist, soldier, and inventor, the fourth of the name, b. Rhinebeck, New York. He served on Gen. Morton's staff (1894-6) and in the Sp.-Amer. war during the Santiago campaign (1898). He lost his life in the *Titanic* disaster of 1912. He pub. *A Journey in Other Worlds: A Romance of the Future*, 1894.

Astor, Nancy Withers, Viscountess (1879-), Anglo-Amer. politician, wife of the 2nd Viscount A. of Cliveden (d. 1952) (q.v.), whom she married in 1906. A daughter of Chiswell Dabney Langhorne of Virginia, she was b. at Mirador in that state. She was the first woman to sit as a member of the Imperial House of Commons (though not the first to be elected, that being Countess Markievicz, a Sinn Féiner who never appeared at Westminster), being returned for Plymouth in 1919 and at every general election

subsequently, until her retirement from Parliament in 1945. She has always been a keen champion of women's rights, social reform, and temperance movements. She assisted Margaret McMillan in founding the Rachel McMillan Training College. Pub. *My Two Countries* in 1923.

Astor, Waldorf, 2nd Viscount (of Cliveden) (1879-1952), politician, educ. at Eton and New College, Oxford. He was Unionist M.P. for Plymouth 1910-19. He held many subordinate ministerial posts, and did useful work as chairman of the Parl. Committee on the Prevalence of Consumption, one outcome of which was the estab. of sanatoria under the Insurance Acts. He was also interested in social reform and agriculture, and had a famous racing stud. On his succeeding his father as Viscount A. his wife Nancy (see ASTOR, NANCY WITCHER, VISCONTRESS) was returned for Plymouth. He controlled the Sunday newspaper, the *Observer*.

Astor, William Backhouse (1792-1875), eldest son of John Jacob, the merchant, the greater part of whose fortune he inherited and increased by real property investments. The building for the A. library, to which he gave over half a million dollars, was erected under his direction. Sometimes known as the 'Landlord of New York.'

Astor, William Waldorf, 1st Viscount (1848-1919), capitalist, b. New York. Assumed management of the A. estates in 1871. He was elected to the New York Assembly in 1877, and to the Senate in 1879. From 1882 to 1885 he was a minister to Italy. In 1890 he succeeded to an estate valued at \$200,000,000. In 1893 he bought the *Pall Mall Gazette*, and founded the *Pall Mall Magazine*. In 1899 he became a Brit. subject. A. subscribed large sums to various war funds. He was created a peer in 1916, and viscount in 1917.

Astors, Ashtaro, see ASTARTE.

Astorga, Emanuele d', Baron (1680-1757), amateur singer, harpsichordist, and composer of high artistic merit. After a quarrel with his father he led a precarious and romantically adventurous life in various cities of Italy, as well as Vienna (c. 1710-14) and Sicily, where he married a girl of 15 in 1717; he left her in 1721, going to Portugal, perhaps to London, and apparently to Spain in the end, for he seems to have d. in Madrid. His masterpiece is a *Stabat Mater*, which is still famous. Composed (especially) chamber cantatas (*cantate da camera*).

Astorga (Rom. *Asturica Augusta*), Sp. tn in the prov. of León. It is walled, has a 15th-cent. cathedral, and is famous for its cakes (*mancuadras*). Pop. 11,500.

Astoria, tn in Clatsop co., Oregon, U.S.A., at the mouth of the Columbia R. It is the oldest Amer. settlement in the Columbia valley, and takes its name from its founder, John J. Astor. Salmon tinning and lumbering are the prin. industries. Was seized by Brit. in 1813, but restored 2 years later. Pop. 12,330.

Astraea, the Gk star-maiden, daughter of Zeus and Themis. The last of the

goddesses to leave the earth, which she did at the advent of the Bronze Age, she is immortalised among the signs of the zodiac as Virgo.

Astragal (from the Gk *astragalos*), moulding used in architecture, and usually applied to the upper end of the shaft of a column, and to its base. It is also used in the entablatures of all the Rom. orders. In Gk architecture an example is found in the base of the Ionic temple of Minerva Polias at Priene.

Astragalus, family Leguminosae, genus of over 1000 ann. or perennial herbs, sometimes called milk-vetch. *A. tragacantha* is an evergreen shrub, yielding gum tragacanth, of S. Europe; *A. alopecuroides* and *A. monspessulanus* are good garden perennials; *A. danicus* is the native purple milk-vetch.

Astrakhan: 1. Oblast in European Russia, on the Lower Volga, adjacent to the Caspian Sea, in semi-desert lowland with an extreme continental climate. There are salt deposits in Lake Baskunchak. Area 29,400 sq. m.; pop. (1956) 666,000, mostly Russian (until 1914 partly Kalmyk, q.v.). It has a fishing industry, agriculture on the Volga-Akhtuba flood plain (melons, vines, cotton), and cattle and sheep raising for meat and wool.

2. Cap. of the above, in the Volga delta, economic and cultural centre of the N. part of the Caspian Sea area. It is the biggest port on the Caspian Sea (transfer of Baku oil to Volga ships) and the foremost fishing centre of the U.S.S.R.; it has large fish canneries. Pop. (1956) 276,000 (1860, 45,000; 1914, 150,000). Founded by the Tatars near the site of Itil (q.v.), it became the cap. of the Astrakhan' Khanate (q.v.); in 1556 it was conquered by Ivan the Terrible and transferred to its present site. Until 1917 it was the centre of a flourishing trade with Persia, Khiva, and Bokhara.

Astrakhan' Khanate, Tatar state formed in middle of 15th cent. upon break-up of the Golden Horde (q.v.), comprising the steppes astride the lower Volga, with Astrakhan as cap. It was annexed to Russia by Ivan the Terrible in 1556.

Astral Spirits, animating principles of the heavenly bodies according to anct E. belief. The doctrine was accepted by many Jews, Greeks, and Romans, though such beliefs were always looked upon with suspicion. In medieval times this doctrine became widespread. A. S. were then conceived to be fallen angels, or, at least, powers less akin to heaven than to hell, intimately concerned with the affairs of mortals, and able to be bound by magic to their service.

Astringents, remedies which cause contraction of muscular fibre and condensation of the tissues, mostly by coagulating albumin. They are used to check haemorrhage, externally or internally, and diarrhoea. The most important are tannic acid and gallic acid, the mineral acids and most metallic salts.

Astrolabe (Gk *astēr*, star; *labein*, to take), instrument used by astrologers for

taking the altitudes of the heavenly bodies. A.s were not only used by astrologers, but also in portable form by travellers for astronomical and topographical calculations. Chaucer in 1391 wrote a prose treatise on the A. for the use of his son. There was also another species of A. for marine calculations of the lat. Columbus used such an instrument on his voyage of discovery. See R. T. Gunther, *The Astrolabes of the World*, 1932.

Astrolabe Bay, large bay on the NE. coast of New Guinea (q.v.).

Astrology, pseudo-science concerned with the heavenly bodies; in modern times it has been confined to the art of divination from the position of celestial bodies, but in anct times it embraced also what is now called astronomy. Formerly the 2 depts of the subject were distinguished thus: (1) Natural A., consisting in the calculation of the movements of the heavenly bodies; (2) Judicial A., consisting in the study of the supposed influence of the stars, etc. on human life and destiny. A., therefore, was a curious mixture of science and quackery, or rather A. was the pseudo-science out of which the science astronomy evolved. A curious parallel is seen in the research of the medieval alchemists, out of whose pseudo-chem. true chem. evolved. A. reached its zenith among the Babylonians—so much so that subsequently Chaldaean became a synonym for astrologer. Babylonian life was in early times nomadic, and the environment afforded the people an unobstructed view of the heavens. From the elementary observation that the sun sustains life throughout the world developed the belief that the other heavenly bodies, too, governed nature, and were the abode of the divine element. Just as A. was being superseded by astronomy in Babylon, its influence spread westward. Among the Greeks judicial A. was never so popular as it became at Rome. The mathematici, or Chaldaean astrologers, were always a source of annoyance to the Rom. authorities, and in Tacitus we read that though they were repeatedly expelled from Rome, they always returned. The nucleus round which A. grew was the belief that the divine energy was manifested in the movements of the sun and the planets. The correct interpretation of the position of these was a key to the will of heaven. Gradually the system was enlarged. The relative positions of the planets and their positions relative to the fixed stars and constellations gave more information. As the field of observation widened, the amount of information derived widened with it, until it embraced every experience of human life. This information was augmented by the theory of repeated omens, e.g. the postulation that if a certain event happened while a certain planet occupied a certain position, the recurrences of that position of the planet would also foreshadow a recurrence of the event. The reaches of astrological information were also extended by the association of ideas. The divers planets

were associated with various passions and things, and the positions of the planets would therefore denote a state of the passions, etc. with which they were associated. Moreover these planets were associated with the various parts of the human body; hence medicine became a dept of A. Mars, for example, being the tempestuous planet, became associated with the bile. Again, not only the position of the planet was important, but which particular sign of the zodiac it occupied, or, in other words, which house of heaven. The days of the week were assigned to the various bodies in the solar system—Sunday to the sun, Monday to the moon, Tuesday to Mars, Wednesday to Mercury, Thursday to Jupiter, Friday to Venus, Saturday to Saturn. (These relations are more immediately apparent from the Fr. names of the days of the week.) In the Middle Ages the astrologer was considered by many people of learning and dignity, as well as by the uneducated, as being almost omniscient. He could foretell the destiny of the individual by calculating which star was in the ascendant at the time of his birth. The ascendant was that sign of the zodiac which was nearest the E. horizon at the time of the event, and that star was most important which rose at that precise moment, i.e. was in the ascendant. Limitless information could thus be derived from these details regarding the character, physique, and destiny of the individual. See also DIVINATION. See M. Graubard, *Astrology and Alchemy*, 1953.

Astronomer Royal, head of Royal Greenwich Observatory, appointed by the Prime Minister under the royal sign-manual. The office was estab. in 1675. The present A. R. is Richard van der Riet Woolley (q.v.).

Astronomy (Gk *astrōn*, star; *nomos*, law), science which treats of the heavenly bodies and all phenomena therewith connected. Such phenomena include their movement in the sky, eclipses arising therefrom, their influence on the earth and on each other, and changes in their appearances. A. is the oldest, most exact, and most widely embracing of all the sciences, and, as the great Laplace truly said, presents the longest chain of discoveries. A., rising in the mists of antiquity, attained to the position of an exact science under the Greeks, but during their time, and for many cents. after, it was closely allied to, if not almost overlaid by, the pseudo-science of astrology. However, with the revival of learning in the 16th cent. and the crowding discoveries which resulted from the invention of the telescope at the beginning of the 17th, A. was able to slough its astrological covering even as chem. arose from alchemy. A. in modern times has been generally divided into 3 main divs., known as (1) practical, (2) theoretical, and (3) physical. The first deals with the observation of the celestial objects, and necessarily therefore concerns itself with the instruments and observatories used in this work. The second, or theoretical A., is practically a branch of

higher mathematics, and is the application of the fundamental laws of gravitation to the observations of the practical branch. The third branch of the science, the physical, trenches on the domain of chem. and physics, and is the application of the terrestrial sciences to the heavenly bodies. This branch of the subject is the most recent in date, but of great and increasing importance, and serving to weld into one harmonious whole all the sciences. Each of these 3 main divs. has its subdivs. according to the nature of the celestial object observed, or the instrument used. The known heavenly bodies are the sun, the moon, the planets, the satellites (or moons) of the planets, the asteroids (small planets), meteors (shooting stars), and comets, all of which belong to what is known as the solar system, and the bodies immeasurably more remote, the stars and nebulae. The 4 chief instruments used in observations are: (1) a transit instrument which can be moved only in the meridian and is used to determine the exact time of transit of a heavenly body; (2) equatorially mounted and movable telescopes, capable of following the movements of the heavenly objects and determining their co-ordinates; (3) an altazimuth mounting in which the telescope can be moved only in azimuth and altitude. This form of telescope is more suitable for amateurs and is limited to the smaller ones; (4) the spectroscope, for ascertaining the physical composition of the body observed; and (5) the photographic camera for securing a permanent and trustworthy record of celestial objects too faint to be perceived by even the optically assisted human eye. These subdivs. have their special names and their practical, theoretical, and physical sides. What is known as solar physics is the study of the sun's physical condition; the mapping of the moon's surface is known as selenography; and the name sidereal A. attaches to the special study of nebulae, clusters, and the so-called fixed stars.

From the foregoing paragraph it will be seen how vast is the subject we have to deal with. It is impossible in this article to give more than an outline of the science and, in the main, a chronological record of discoveries. For details the reader is referred to the articles on the different categories of heavenly bodies, the instruments used, and the names of constellations and astronomers. The prin. articles are as follows: ALTITUDE; ASCENSION; RIGHT; ASTEROIDS; AZIMUTH; BRAHE; CONSTELLATION (see also various names); COPERNICUS; DAY; EARTH; ECLIPSES OF THE SUN AND MOON; ECLIPTIC; EQUIINOXES; GALAXY; GALILEO; GRAVITATION; HERSCHEL; HIPPARCHUS; HORIZON; KEPLER; LAPLACE; LATITUDE AND LONGITUDE; LIGHT; MERIDIAN; METEOR; METROLOGY; MOON; NEBULAE; NEWTON; OBSERVATORY; OCCULTATION; OPTICS; ORBIT; PARALLAX; PERTURBATIONS; PHASES; PHOTOGRAPHY; PHYSICAL CONSTANTS; PLANET (see also various names); POLES; PRECESSION; PTOLEMY; REFLECTION; SATELLITE; SEASON; SEXTANT; SOLAR SYSTEM; SOLSTICE; SPECTRUM AND

SPECTROSCOPE; STAR; SUN; TELESCOPES; TIDES; TRANSIT INSTRUMENT; YEAR; ZODIAC.

Before turning to the hist. of A. it will be well to take a brief glance at the position of the earth in the solar system, and of that system in the universe. In the course of the last 20 years our knowledge of the universe has been enormously increased, especially with regard to the origin of the stars, their composition, their hist., their sizes, and their temps. The science of astrophysics has brought about this enlightenment, and an attempt is made, in what follows, to describe the results of the recent progress, made possible only by new methods of attack and by great improvement in the design and technique of astronomical instruments. The centre of research has shifted from the solar system, but we must briefly remark on that system, and refer the reader for further details to the articles on PLANET, COMET, and METEOR. The solar system was once supposed to have had its origin in the approach of another sun to our present sun: the gravitational attraction between 2 such bodies would be enormous, and just as our small satellite, the moon, causes tidal waves in our oceans, so the approaching sun caused great tidal waves in our sun, and streams of matter were ejected from it. This matter rotated round its parent and in the course of time condensations took place which served as nuclei for the building up of the planets, which continued, and still continue, to revolve round the sun at different distances from it. This theory is no longer held, and though many others have been suggested, there is no consensus regarding the origin of the solar system. Kepler and Newton (q.v.) studied the orbits of the planets and pronounced the laws which govern their motion.

There are 9 major planets, and about 3000 known minor planets or asteroids (q.v.), of which more than 1500 orbits have been computed. The solar system consists of the central star or the sun, with the planets and their attendant satellites, and in addition to these, there are meteors and comets. In order of their distances from the sun, the major planets are Mercury (nearest), Venus, the Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto; the asteroids lie between Mars and Jupiter. The Greeks gave planets the name wanderers (*Gk planets*, a wanderer). All the planets shine by the light they reflect from the sun, and they describe approximately circular orbits about it. Their orbits are really elliptical and the sun is in one focus of the ellipse. They revolve in the same direction round the sun, and their orbits lie in approximately the same plane. The period of revolution—the planet's year—varies, Mercury's being only 88 days as compared with our 365½ days and Pluto's 248 years. In addition to this revolution the planets turn on their axes, and it is this rotation which causes their days and nights.

The mean distance of the Earth from the sun is 93,000,000 m.: Mercury is about 37,000,000 m. from the sun, while the

furthest planet, Pluto, is 3,660,000,000 m. from its parent. Conditions such as temp. and the nature of the atmosphere of the planets depend on their hist. as well as on their positions with respect to the sun; there is a possibility of life such as we know it only on the planet Mars: the remaining planets are either too hot or too cold or devoid of an atmosphere capable of supporting life.

The Earth is approximately a sphere nearly 8000 m. in diameter; the sun's diameter is more than 100 times as great. It is our nearest star and yet it is exceedingly small in comparison with the giant stars known to us. The giant star Betelgeuse, the bright red star in the N.E. of the constellation of Orion, is so great that if it replaced our sun it would fill the whole of the space between the earth and the sun. Its diameter varies between 210 and 300 times the sun's diameter, the variation being due to a continuous expansion and contraction. Even with the smaller diameter a bullet travelling at 1000 ft a sec. would take 90 years to travel round its equator. Its apparent size is small because it is so far away from the earth, namely 190 light-years away. Light travels at 186,283 m. per sec. and takes rather more than 8 min. to travel from the sun to us; by 1 light-year we mean the distance that light would travel in 1 year, i.e. nearly 6 billion miles. When we look at Betelgeuse we see it as it was 190 years ago: we are, as it were, looking back into the past, but it is less irksome to think of the distances of the stars in terms of light-years. There are at least 80,000 million stars in our galaxy alone, and, with the exception of the sun, which is about 8 light-min. away, the nearest one is Proxima Centauri, 4.1 light-years away, while we know of globular clusters of stars which are 220,000 light-years away from the Earth.

Modern A. has realised that what the ancients called the fixed stars are not fixed, but many of them have velocities much greater than that of our sun: though the constellation of Orion and many other constellations appear to the naked eye to be in the same positions they occupied 1000 years ago, the stars are really moving quickly, and it is merely because they are so very far away from us that they appear to be fixed. In addition to the stars, there are nebular regions in the stellar universe (on which see NEBULAE); it is sufficient to point out here that the present view is that the evolution of the star begins in some nebula and the star that condenses from the nebula is a diffuse mass of gas of low density and comparatively low surface temp. (3000° C.). According to the classification of the Harvard Observatory, the star is then a red giant of type M, e.g. Betelgeuse. The evolution of the star through the successive stages known as M, K, G, F, A, B, and characterised by typical differences of spectra, is accompanied by increase of temp. and a contraction of vol., so that when type A is reached, e.g. Sirius, the surface temp. is about 10,000° C., the density still being somewhat less than that of water. The giant

has now entered dwarfdom, and it begins to cool as it contracts further, and it goes through the same spectral stages in the reverse order, though it is now called a dwarf, because it is much smaller than the giant which emits the corresponding type of spectrum. Our sun is a dwarf star of type G, with a surface temp. of 6000° C. It has still to pass through the K and M stages before its life as a star is completed. The density of a dwarf increases with its age, and there are stars so dense that a tiny portion of no more than the bulk of a match-box weighs as much as a ton. The evolution of the stars is a slow process, and we cannot accept anything less than 3 or 4 thousand million years for the age of the sun. About three-quarters of the stars are dwarfs, and one-quarter are giants, progressing towards their maximum temp. This surface temp. is very small by comparison with the star's interior temp., which is about 20,000,000° C. towards the central regions of our sun, but much lower, and also much higher, for many other stars.

Binary stars and pulsating stars. Many stars which appear single to the naked eye are found to be double stars when examined in a telescope or by the spectroscope. These stars are known as binaries, and consist of 2 stars revolving in orbits about their common centre of gravity. Although Michelson in 1920 constructed his telescopic interferometer, and by means of it measured the diameter of Betelgeuse, few stars appear large enough to the terrestrial observer to be measured in this way, and much of our recent knowledge of the stellar universe is due to the pulsating stars known as Cepheid variables. The star δ Cephei is a prototype of these stars, that occur in all parts of the universe. They are globes which swell and contract in a period of 5½ days, and their pulsations are made known by the corresponding changes in their luminosities. Now, as Eddington points out, the note of a tuning-fork is characteristic of the fork, and in a similar way the period 5½ days is characteristic of stars of identical structure and luminosities. The Cepheid variables therefore serve to measure the distances of various parts of the stellar universe, by comparing the apparent luminosity of any Cepheid star with that of a near star of the same type whose distance can be measured by finding its parallax (q.v.). The realisation of this fact has enabled astronomers to 'measure up' the universe.

We have had, so to speak, a bird's-eye view of the solar system, and have the universe in perspective. We are now in a position to appreciate the hist. of astronomical discovery, which, as has been indicated, is also largely the hist. of the invention of the instruments used and the progress of mathematics. We cannot here make more than a passing allusion to the influence of the discoveries of the astronomer on the mind of man and their reaction on philosopher, theologian, geologist, physicist, and chemist, and must content ourselves by observing that their effect has been profound.

A. is, as we have said, the most ancient of the sciences. Nations who are known to have cultivated it before the Christian era are the Chinese, Hindus, Chaldeans, Egyptians, and Greeks. The Chinese made it a matter of politics, the next 3 of religion, and all, except the Greeks, applied it to astrology. With the Greeks A. was treated merely as any other science, and for this reason, perhaps, it made a more rapid advance with them than among their contemporaries. Which nation was the first to study A. will perhaps never be finally determined: all we can say is that wherever a people emerged from savagery traces can be found of astronomical observations. For each of the above-mentioned nations the claim is made for the honour of being the first to study the science. The Chinese annals go back as far as 2857 BC, but of astronomical phenomena they record hardly anything except the eclipses of the sun and the appearance of comets. The fact of the motions of the planets was known to the Chinese, as was also the Metonic cycle, but not the precession of the equinoxes till about AD 400, or about 550 years after its discovery by the Gk astronomer Hipparchus. A record of the conjunction of 5 planets shows that observations were made by the Chinese at about 2500 BC. The burning by order of the Emperor Tsin-Chi-Hong-Ti (221 BC) of all scientific books may have destroyed evidence of still further astronomical observations. Neither the Hindus nor the Egyptians contributed to A. anything of outstanding importance, but from the accuracy with which the Great Pyramid of Cheops faces the cardinal points it is clear that the Egyptians possessed, even at the most remote period, no little astronomical knowledge. But it is probable that the Chaldeans were the nation which, next to the Greeks, made the most extensive study of the heavens. Certain it is that they had the Metonic cycle, and it is thought that Meton, the Gk astronomer of the 5th cent. BC, who gives his name to this period, may have obtained the cycle from them. They had quite early in their hist. measured the celestial sphere and portioned out and named the sections (signs) of the belt of the heavens through which the sun, moon, and planets apparently move, a belt known as the zodiac. Though their observations never attained to the accuracy of the Greeks, being, in fact, of the roughest kind (the time of eclipses, for instance, being given only in hours, and the part of the diameter eclipsed only within a quarter), they were, nevertheless, the earliest trustworthy observations, and in the hands of Hailey, an Eng. astronomer, led to the discovery of the acceleration of the moon's mean motion. Besides Meton's, these Babylonian astronomers also discovered other cycles, among them being the Saros, i.e. the period of 18 years 11 days after which interval eclipses of sun and moon will again occur at the same intervals. It is not certain when the Saros was discovered, but it is probable that it was some cents. before the Christian era, and the earliest

eclipse (excluding doubtful Chinese accounts) is one referred to on a Babylonian tablet as having occurred in 1062 B.C. Simplicius, a commentator on Aristotle, tells us that Alexander the Great found records in Babylon containing observations of eclipses for nearly 2000 years prior to the conquest of that city by him. These he transmitted to his former tutor Aristotle, but Ptolemy, the great astronomer of the Alexandrian school, mentions only a few of them, and none prior to 720 B.C. But undoubtedly among the Chaldeans A. was gathering a definite shape, and among the instruments they used we find the clepsydra (water clock) and the gnomon as measuring solstices. See HOROLOGY.

To the Greeks, who took the lead in the ancient world in so many other matters, must go the honour of raising A. to the dignity of an exact science. From Thales (640 B.C.) to Hipparchus (190-120 B.C.) was built up a wonderful body of exact astronomical knowledge which for 15 cents. was not appreciably added to. Thales, founder of the Ionian or physical school of philosophy, and one of the Seven Wise Men, predicted the eclipse of the sun which happened in 584 B.C. in the reign of Alyattes. He may be said to be the founder of Gk. A., but for many reasons we shall reserve for Hipparchus the title of Father of A. It is probable that Thales in predicting the solar eclipse did so by means of the Chaldean Saros (mentioned above). He also held, and is the first of whom we have record of so holding, that the earth was a sphere, that the stars were fiery bodies, and he also taught his countrymen how to steer their vessels by means of the Little Bear, an asterism nearer the Pole star than the Great Bear, which the Greeks had hitherto been satisfied with as an indication of the N. Anaximander, his successor, is credited with asserting that the earth rotated on its axis, and that moonlight was but reflected sunlight. Pythagoras (500 B.C.) promulgated the idea, which was not generally accepted till many cents. afterwards, that the earth and other planets circulated round the sun. He also was probably the first to teach that the evening and morning stars were the same planet. Meton (432 B.C.), already mentioned, introduced the cycle bearing his name, which Calippus, 100 years later, improved. Eudoxus of Cnidus (370 B.C.), according to Pliny, brought the year of 365½ days into Greece, and wrote some astronomical works. Aristotle (384-322 B.C.), perhaps the greatest all-round scientist among the ancients, wrote on A., but his works were lost. We know, however, that he gave a correct interpretation of the phases of the moon. The 4th cent. B.C. saw the foundation at Alexandria of the school of that name. The Alexandrian astronomers were encouraged in their task by the Ptolemaic dynasty. Their work was characterised not so much by new theories or discoveries, as by a long series of painstaking, connected, and accurate observations. They no doubt owed much to Euclid of Alexandria (300

B.C.), who did so much to advance the trigonometrical science by which astronomical calculations are made. Among the more distinguished representatives of this school were Timocharis and Aristyllus (c. 300 B.C.), who made observations which enabled Hipparchus to discover the precession of the equinoxes (q.v.). Eratosthenes, who was librarian at Alexandria (276-196 B.C.), attempted to ascertain the size of the earth—and roughly succeeded—by means of measuring an arc of the meridian between Alexandria and Syene in Lower Egypt, which he found to be 7°2'. He made other useful observations, such as the determination of the value of the obliquity of the ecliptic, a value adopted by his 2 great successors, Hipparchus and Ptolemy.

Hipparchus was not merely the greatest of the Gk. astronomers, but one of the greatest of all astronomers. He was b. at Nicaea in Bithynia about 190 B.C., lived at Rhodes, and d. 120 B.C. In his youth he wrote a commentary on a poetical description of the stars by Aratus, and this is the only direct knowledge we have of him. To his great successor and only rival in fame among the ancients, Ptolemy, we are indebted for what we know of his discoveries. As said above, he discovered the precession of the equinoxes by a comparison of his own observations with those of Timocharis and Aristyllus. He was a great mathematician, and it was he who first employed processes analogous to those of plane and spherical trigonometry, for which he constructed a table of chords. He determined the mean motion of the sun and of its apogee, the inequality of the sun's motion, and the length of the year to greater exactness than his predecessors. He found the mean motion of the moon, of its nodes, and of its apogee; its parallax, the eccentricity and inclination of its orbit, and the equation of its centre. His observations also led him to suspect another inequality in the moon's motion. This was the 'evection' (q.v.) afterwards discovered by Ptolemy. He made one of the first steps towards the correct representation of astronomical phenomena, by supposing the sun to move round the earth in a circle, the earth not being at the centre (see PTOLEMAIC SYSTEM). He was, of course, incorrect as to which body moved round the other, but he was reaching forward to the correct description of celestial motion, i.e. the ellipse. He made a catalogue of 1081 stars, giving their lat. and long. We can judge of the value of his work by the statement which has been made that had Hipparchus possessed the pendulum and the telescope, 50 years might have enabled his successors to place A. in the state in which it stood at the birth of Newton (1642). Considering his means, his observations are perhaps unequalled, and he well earns the title of Father of A. After the death of Hipparchus there is no astronomer of eminence till Ptolemy. Probably there were many observers, but the loss of even their names, and the silence of Ptolemy himself, make it clear that no discovery of

any importance was made. It is not a little remarkable that Rom. civilisation, which was at its height in the period between Hipparchus and Ptolemy, should have failed to produce, then or at any time, any astronomers of more than mediocre quality. One must, however, mention the name of Sosigenes of Alexandria, who advised and assisted Julius Caesar to reform the calendar, the calendar which, after being slightly revised under Pope Gregory XIII, is in use to-day.

We now come to the second great name among ancient astronomers, Ptolemy, who fl. in Alexandria towards the middle of the 2nd cent. of our era. Next to Hipparchus he was probably the greatest of the ancient astronomers, and with his death the epoch of ancient astronomy terminates. Just as Aristotle in natural science and philosophy dominated learning during the Middle Ages, so Ptolemy in A., and incidentally, we may say, in geography, held supreme sway over scientific men from his own time down to the 16th cent. Further, although he did not originate it, he was the chief exponent of and gave his name to the system of planetary motions known for cents. as the Ptolemaic system. His chief title to fame is that he corrected and improved on the work of his predecessors, particularly Hipparchus, but he made several original discoveries of very great importance. A voluminous writer on many subjects, his astronomical work, the *Almagest* (q.v.), summed up practically all the astronomical knowledge of the ancients, and it is, in fact, practically our chief source of information on this subject. The prin. discovery of Ptolemy is that of the 'evection' of the moon, an inequality such as would be caused by an alternate increase and diminution of the eccentricity of the moon's orbit. He also discovered the refraction, and made some tolerably correct experiments to determine its law, explaining the apparent enlargement of the disks of the sun and moon when near the horizon. The projection of the sphere of Hipparchus he extended, and, in fact, he entered into the investigation of every point which Hipparchus had touched, verifying or altering. He attempted to account for the motions of the planets by supposing them to move uniformly in circles, the centres of which circles themselves moved uniformly round the earth. The whole Ptolemaic system is now on the scientific scrap-heap, but for his painstaking work as an observer and as the historian of A. the name of Ptolemy will always be honourably remembered.

With Ptolemy the originality of the Gk school ends, as indeed does all of ancient astronomical science. With the rise of Christianity and the descent of the N. barbarians on the shores of the Mediterranean, civilisation suffered an eclipse. A dense pall of scientific ignorance hung over Europe, and in such congenial environment the bastard sciences of alchemy and astrology flourished. But in its darkest hour science has never lacked devotees, though for a while it may harbour in strange households. The sacred

torch of scientific truth was kept alight by the Arabs—an Asiatic and non-Christian people. It is no part of our duty here to animadvert on the dislike, to put it mildly, of A. evinced by the more fanatical of the Christians from the time of Hypatia (end of 4th cent AD) to that of Galileo (17th cent.). We mention these 2 cases in passing because the first-named lived in the period immediately succeeding Ptolemy, and is, moreover, worthy of mention as being the first woman astronomer and mathematician on record. With Galileo the Dark Ages ceased and practical modern A. commenced. But of him we will speak later.

The E. and Cordova caliphs were for the most part generous patrons of learning. By their encouragement of original scientific research and of trans. into Arabic of the works of the old Gk authors, and by, in some cases, actual personal labour in this field of knowledge, the caliphs have earned an honourable position among enlightened princes. The line of Arabic astronomers may be said to have begun in the reign of Al-Mansur, the caliph who built Bagdad, in the year AD 762. In his reign were begun trans. of the Gk writers, and with nearly the same instruments, and the same theory, as Ptolemy commenced a period of 4 cents. of astronomical observation. In the reigns of the great caliph Harun al-Rashid and his son Al-Mamun, both of whom were students of the science, great encouragement was given to A. The most illustrious of this school was Albategini, or Al-Battani (AD 880), and he is, beyond all doubt, the only distinguished observer of whom we know anything between Hipparchus and Tycho Brahe. He discovered the motion of the solar apogee, and corrected the value of the precession, the solar eccentricity, and the obliquity of the ecliptic. He pub. tables, was the first to use sines (instead of chords) and versed sines, and found the length of the year more accurately. The influence of the Arabian school spread to Persia, Turkestan, China, and Spain as Islam advanced on its conquering mission in these countries. In Persia in the 11th cent. fl. the famous astronomer-poet, Omar Khayyam. He suggested a reformation of the calendar which, though not adopted, would, it has been asserted, have made it more accurate than that of Pope Gregory XIII. Ulug Beg (1433), a prince at Samarcand, pub. the most correct catalogue of stars known till his day, but on the whole, though they were assiduous observers and great mathematicians, there was little constructive work in the Arabian school.

The names of 4 great men will be for ever associated with the beginnings of modern A.: Copernicus and Tycho Brahe (16th cent.), Kepler and Galileo (17th cent.). The achievements of these 4 men stand up like peaks, and dwarf all the efforts of their immediate predecessors. With these predecessors we have not space to deal, so must content ourselves with remarking that with the Renaissance, A. was reintroduced into Europe. The Gk

writers were trans. direct, but more often than not their writings filtered through trans. from the Arabic. The first trans. of the *Almagest* of Ptolemy was made under the auspices of the Emperor Frederic II, about AD 1230, and many original Arabic works on mathematics were trans., the latter introducing into Europe algebra and the decimal fractions.

Nicolaus Copernicus, sometimes called the founder of modern A., was b. on 19 Feb. 1473, at Thorn in W. Prussia. In his almost posthumously pub. book, *De Revolutionibus* (it appeared a few hours before his death), Copernicus laid down 2 propositions. With the anc. Greeks of the Pythagorean school he asserted that the diurnal movement of the stars, etc., was apparent only, and resulted from the rotation of the earth about its axis in the opposite direction. He also held that the earth was one of the planets, and, like them, revolved round the sun. These, of course, are to-day the commonplaces of A., but in his time practically every scientific man believed that the earth was the hub of the universe. Copernicus was in error in describing the motion of the planets as circular, instead of elliptical, as Kepler later found to be the case, and his book is a curious mixture of his own original and sagacious notions and of the old philosophy, such as that the planets moved in crystal spheres. His system, to which his name is attached, did not at first make great headway. It encountered the *odium theologum* of his immediate successors, and it needed the thought of Kepler and the application of the newly invented telescope to A. by Galileo, added to the discovery, still later, of the laws of gravitation by Sir Isaac Newton, to estab. finally the Copernican system. What perhaps hindered the general acceptance of the Copernican system more than theological dislike or the inertia of the human mind was the fact that the second of our quartet of giants, Tycho Brahe (1546-1601), the greatest practical astronomer of his time, constructed yet another planetary system, a blend of the Ptolemaic and Copernican, which held together against the weak and ineffective criticisms of the Copernicans better than the Ptolemaic system. The system of Tycho consists in supposing (1) that the stars all move round the earth as in the Ptolemaic system; (2) that all the planets, except the earth, move round the sun, as in the Copernican system; and (3) that the sun, and the imaginary orbits in which the planets are moving, are carried round the earth. From his observation of comets he pointed out that the spheres of the planets could not be solid, since they were cut in all directions by the orbits of comets. And Tycho was the first to prove that comets had such a parallax as precluded their being atmospheric or even sublunary bodies. By his demolition of the crystal planetary spheres he dealt a severe blow, the first decisive blow, to received notions, and at the same time that he damaged the Ptolemaic structure he weakened the

Copernicans' arguments, for the Copernicans of that time, having no inkling of the law of gravitation, had adopted the anc. idea of crystal spheres, in which the planets were embedded, revolving round the sun. Tycho has been reproached for not adopting the more simple Copernican system, but it must be remembered that the Tyconic system explained all appearances as well as that of Copernicus, and, in fact, while it seized by far the greater proportion of the advantages of the latter, it was not open to the most material objections. We must also bear in mind that Tycho was the last great astronomer without the help of the telescope, and that the other confirmatory sciences were in his day most crude. The most stupid general can win a battle if his opponent be more stupid, and of all the inconclusive arguments of that day, the reply of the Copernicans to Tycho was the most inconclusive. The Copernican system appears a premature birth; the infant long remained sickly and would certainly have died if it had not fallen under better management than that of its own parents.

But this aberration apart, the work of Tycho Brahe was of a most solid and accurate nature, and furnished the means by which the Ptolemaic and Tyconic systems were finally destroyed. He made a catalogue of the fixed stars, more accurate than any which preceded, and he greatly improved and extended the instruments in use as well as all methods of observation. The celebrated Kepler, who helped to demolish Tycho's system, was for the last 2 years of Tycho's life his colleague in his work. It was with Tycho's accurate observations to work upon, and following Tycho's much-needed advice to apply himself to the deduction of causes from phenomena, that Kepler made his marvellous discoveries.

Unlike his master, Kepler (1571-1630) was a Copernican. In addition to A. he studied and made some discoveries in optics and physics, but it was chiefly as a mathematician that Kepler excelled. Too much importance cannot be attached to his 3 laws of planetary motions, laws which, though not proved till Newton's *Principia* appeared many years later, laid securely the foundations of modern A. Like all great things, Kepler's laws are in essence marvellously simple, and, like simple fundamentals, are beautiful. As the geometrician derives pleasure from the contemplation of, say, Euclid's 47th proposition (Bk 1), 'Theorem of Pythagoras,' so the astronomer feels a pleasurable emotion by allowing his mind to dwell on Kepler's third law. The first 2 laws were announced in Kepler's work, *The Motions of Mars*, pub. in 1609, and the third in his *Harmonice Mundi*, 1619. The laws are as follows: (1) *The planets move in ellipses, having the sun in a focus.* (2) *The imaginary straight line joining a planet to the sun (radius vector) sweeps out equal areas in equal times.* (3) *The square of the time of revolution of any planet about the sun is proportional to the cube of its mean distance from the sun.*

In the hands of Galileo Galilei (1564-1642), or, as he is more generally known by his Christian name alone, Galileo, the telescope settled the problem of the planetary system. Galileo, a great astronomer, was nevertheless more than an astronomer, and may be said to have invented the science of dynamics. Quite early in life (1581) he discovered the isochronisms of the pendulum, an invaluable principle which led to the more accurate construction of clocks. In 1609 Galileo made a telescope from a general description of a magnifying instrument made by one Jansen in Holland. He was indubitably the first to apply the telescope to A., and on the very first time that he used it he discovered 3 of the satellites of Jupiter (7 Jan. 1610). A few nights later he discovered a fourth moon to Jupiter. In the same year he saw spots on the moon (mts, etc.), resolved the Milky Way into stars, discovered the rings of Saturn and the phases of Venus. The following year he observed sun-spots, and from them concluded that the sun rotated on its axis. None of these observations required a great amount of skill, and all the phenomena mentioned may be easily observed by any amateur with a small telescope, but they served to bring down with a run the fast crumbling fabric of the Ptolemaic system. For it was an obvious analogy to make, that if the sun rotated on its axis, why not the earth? If Jupiter could carry its 4 moons along with it round the sun, why could not the earth carry its moon? And, moreover, the resemblance between the phases of Venus and the moon was yet one more argument in favour of the Copernican theory. For further details of the life and discoveries of this most interesting man the reader is referred to the article GALILEO.

It will not be necessary to emphasise the profound change that came over A. with the introduction of the telescope (q.v.). Even with the small light-grasping power of the primitive instrument of Galileo the whole face of the heavens was altered, and it was only a matter of time before the continued improvement of this wonderful instrument would, as it were, induce the universe to yield up more and more of its secrets. But for a long while the telescope was a small instrument and suffered from the defect of being chromatic. This defect was remedied by Dollond, an Eng. optician, in 1758, but till his day the largest *refracting* telescope did not have an object glass of a greater diameter than 3½ in., a size which scores of astronomical amateurs possess to-day. The search for a form of telescope that would obviate the drawbacks of chromatic light led to the invention of the reflecting telescope: the Gregorian by Gregory in 1663, and the Newtonian by Sir Isaac Newton in 1669. As the mirror of the reflecting telescope offered less difficulty in construction, and was consequently cheaper, for a long time much more progress was made with the reflector than with the refractor. In 1723 Hadley had made a reflector with a

mirror of 5½ in. diameter, and Sir Wm Herschel (1738-1822) made telescopes with mirrors ranging from 6 in. to 4 ft. The progressive increase in the size of the telescope has enabled the surfaces of the sun, moon, and planets to be surveyed in a more and more detailed manner. It enabled Gassendi in 1631 to observe for the first time the transit of Mercury over the sun's disk, and to measure the diameter of Mercury. Eight years later Horrocks and Crabtree first observed a transit of Venus over the disk of the sun, and the former ascertained the diameter of that planet. The telescope enabled Cassini in 1665 to determine the time of the rotation of Jupiter, and in the following year he determined the time of rotation of Mars and made a first approximation to that of Venus. In 1675 Roemer discovered the velocity of light from observations of Jupiter's satellites (a discovery since confirmed by other means in the physical laboratory), and the same year saw the founding of the world-famous Greenwich Observatory, with Flamsteed as first astronomer royal. The first transit telescope was used by Roemer in 1689, 2 years after the pub. of Newton's *Principia*. In this epoch-making work Newton provided the mathematical proof of Kepler's laws and laid down the law of gravitation. It is, of course, too technical a matter to enter into here. In 1705 Halley first predicted the return of the comet to which his name has been given, and it duly turned up again in 1758, the year predicted. Flamsteed's great work, *Historia Coelestis*, issued in 1725, made a great step forward in sidereal A., giving a catalogue of the stars such as had never before been pub. Sir Wm Herschel is, however, generally spoken of as the founder of sidereal A., his motto being 'Whatever shines should be observed.' With his giant reflecting telescopes he undertook a complete survey of the stars in the N. hemisphere, in the course of which he found the planet Uranus, 1781. The story of the observation of the stars in the S. hemisphere is bound up with that of his son, Sir John Herschel, and his son's forerunner, Lacaille. The latter, a Fr. astronomer, went to the Cape of Good Hope in 1750, and he remained there 4 years. He observed nearly 10,000 stars and formed 14 new constellations. Sir John Herschel, carrying on the work of Lacaille, did for the S. hemisphere what his father had done for the N., and pub. in 1847 a complete survey of the S. heavens. The first few minor planets (asteroids) were discovered in the first decade of the 19th cent., and the planet Neptune in 1846.

By the middle of the 19th cent. the position of A. stood thus. The whole surface of the sky had been carefully surveyed, and catalogues prepared giving thousands of stars and scores of nebulae. The solar system was known as we now know it except for the discovery of a few small satellites and additions to the swarm of minor planets. The motions of all heavenly bodies were referable to the laws of gravitation, enunciated by Kepler

and elaborated by Newton and Laplace. Large and accurate telescopes were in existence for examining the surface of sun, moon, and planets, and many of their features had been recorded. Observational A. was beginning to yield fewer results. How great a progress had been made in telescope construction may be judged from the statement of a former astronomer royal (Sir Frank Dyson's *Astronomy*) that the moon could be seen through modern telescopes as it would appear to the naked eye at a distance of 200 m., and the distance is considerably less now with the modern giant telescopes. At this distance a circle a mile and a half in diameter would appear as large as the whole moon does to the naked eye at its distance of 240,000 m., so that tns, lakes, etc., if they existed on the moon, could be distinguished. What, then, would be the line of advance for the latter-day astronomer? The answer is that he turned his attention to the sidereal universe and to an examination of the composition of the heavenly bodies.

The dictum of the biologist, 'Want creates organ,' applies here. The need for instruments to aid man in his self-appointed task of plumbing the universe resulted in the application of the spectroscopic and the photographic camera to astronomical uses. The chemist came to the aid of A. with his sensitive photographic plates and knowledge of the spectra or earthly elements, and the astronomer repaid his brother scientist by his discovery of new elements in the sun—elements unknown to mundane chem. For a more detailed account of celestial and terrestrial spectroscopy the reader is referred to the article SPECTRUM AND SPECTROSCOPE: it will suffice here to explain the principle of the spectrum. Light is capable of being split up into component parts in the same way as sound. If we hear a band playing, our ears are able to distinguish the notes of the trumpet, horn, bassoon, violin, double bass, clarinet, and so forth, though all these instruments are being played simultaneously. In like manner, a beam of light if passed through a glass prism will be split up into a band of multi-coloured light, ranging from violet at one end to red at the other, the colours shading into each other by insensible gradations. These colours correspond to the length of the vibrations of the light waves and the time of vibration, and as these different vibrations are produced by the light emitted by the various chemical elements in a state of combustion, we are enabled by this means to tell roughly the composition of the luminous body. If we still further expand the band of light by passing it through one or two more prisms, we find on careful examination that it is generally crossed by a number of bright or dark lines. Each of these lines stands for an element in combustion, and the lines produced by that element are always in the same position on the spectrum. Thus the spectrum of common salt shows 2 bright yellow lines, and, no matter in what part of the universe (sun, earth, or

stars), common salt, if in a state of combustion sufficient to produce light, will always show these 2 bright yellow lines in the same position, or, what amounts to the same thing, 2 dark bands in the same position. The discovery of this fact by Fraunhofer and the development of this discovery by Kirchhoff laid the basis of solar and stellar chem. By this means we can tell the physical construction of every luminous body in the universe, whether it be sun, star, comet, nebula, or meteor. And as the spectrum is susceptible of being photographed, and as the photographic plate can record the ultra-violet light not visible to the human eye, great accuracy can be observed in these observations.

Another remarkable result is obtained from spectrum analysis. We have seen how the lines on the spectrum show the composition of the body emitting light, but another feature of the spectroscopic of equal, if not surpassing, importance to the astronomer is that known as Doppler's principle. This principle enables the motion and direction of the light-emitting body to be measured. According to the number of light vibrations per sec. the position of a line in the spectrum is determined. If the light-giving object approaches the spectroscopic, or vice versa, more than the usual number of vibrations will reach the observer in each sec. On the other hand, if either the source of light or the spectroscopic recedes from the other, the number of vibrations will be less than the normal. This departure from normality is shown by a shifting of the lines (not in relation to each other, but of the whole lot) on the band of chromatic light: on approach the lines shifting towards the violet end; when receding towards the red end. Sir Wm Huggins was quick to see how this principle could be utilised in A., and was the first so to apply it. The principle has enabled us to tell whether stars are approaching or receding from the sun; at what rate they are doing so; and to detect the rotation of the sun on its axis, and the rotation of Saturn's rings. And as the spectrum can be photographed a permanent and accurate record can be made, and, as above mentioned, part of the spectrum invisible to the human eye can be recorded on the photographic plate.

Astrophysics, armed with the spectroscopic, made great strides during the latter part of the last cent., when it was discovered how to analyse spectra. Since 1895 atomic physics has produced epoch-making results, and as one of the most striking advances, made in 1913, was the interpretation of the spectra of the element, it may be imagined that astrophysics, too, received a new interpretation, and the present cent. may be called the golden age of physics and A., for a knowledge of the atom is invaluable in interpreting the physics of the stars. As in physics, so in A., the recent progress has been due to a large number of learned astronomers, and for details of the hist. of A. during the present cent.

the works mentioned in the following brief bibliography should be read. Mention must be made of the Californian observatories, which are modern observatories containing the finest instruments in the world, and, in particular, the Mt Wilson Observatory, which contains Michelson's famous telescopic interferometer, with which he first measured (in 1920) the angular diameter of a star; and of the 200-inch telescope set up on Mt Palomar, which, with its reflector, weighs 1,000,000 lb. and is able to photograph light sources 1,000,000,000 light-years distant; and also of Eddington (q.v.), the Eng. astronomer, whose work on *Stars and Atoms* has estab. him as not merely one of the greatest of Eng. astronomers, but one of the greatest of physicists.

See Sir H. Spencer Jones, *General Astronomy*, 1922; H. Macpherson, *Modern Astronomy*, 1926, and *Makers of Astronomy*, 1933; A. Eddington, *Stars and Atoms*, 1927; Sir J. Jeans, *The Mysterious Universe*, 1931; E. A. Milne, *The White Dwarf Stars*, 1932; J. Stokely, *Stars and Telescopes*, 1936; Sir F. Dyson and R. Woolley, *Eclipses of the Sun and Moon*, 1937; R. Waterfield, *A Hundred Years of Astronomy*, 1938 (useful to the astronomer and intelligible to the general reader); F. W. Merrill, *The Nature of the Variable Stars*, 1938; W. T. Skilling and R. S. Richardson, *Astronomy*, 1939; E. A. Beet, *A Text-book of Elementary Astronomy*, 1945; M. Davidson (ed.), *Astronomy for Everyman* (2nd ed.), 1955 (a symposium by experts in their various fields). See also COMET and ROCKETS AND SPACE TRAVEL.

Astrophel, see SIDNEY, SIR PHILIP.

Astrophysics, branch of astronomy which relates to the physical composition of the stars and their atmospheres, to their temps., light-power, etc. See ASTRONOMY and SPECTRUM AND SPECTROSCOPE.

Astruc, Jean (1684-1766), Fr. physician, b. Sauve in Languedoc. In 1711 he was prof. of anatomy at Toulouse, and from 1716 until 1726 prof. of medicine at Montpellier, when he was appointed prof. of medicine at the Collège de France, Paris. Of his numerous medical works his most famous deal with sexual disorders and kindred subjects, e.g. *De morbis veneretis libri sex* (1736). Besides being a physician, he was also a philosopher and wrote on the dual sources of the book of Genesis.

Astura, lt. vil., in Lazio (q.v.), 39 m. SE. of Rome (q.v.). It is on a peninsula, once an is., at the mouth of the R. A., and has interesting Rom. remains. Cicero (q.v.) had a villa here, to which he retreated after his daughter's death; Augustus and Tiberius (qq.v.) both frequented it, and according to Suetonius both here contracted their fatal illnesses. On the site of the villa there is now a tower.

Asturias, anct monarchy of N. Spain, the first king of which was Pelayo (q.v.). It is now a prov., generally called the prov. of Oviedo (q.v.). The inhab. of the region strenuously resisted the Romans, and, at a later date, maintained their

independence against the Moors. They consequently regard themselves as the purest Sp. stock. The heir to the Sp. throne bore the title Prince of A. See also LEÓN.

'Asturias', The, name of a Brit. hospital ship which the Germans attempted to torpedo off Havre on 2 Feb. 1915. Later the Germans issued an apology to appease hostile judgment of neutrals.

Asturia Augusta, see ASTORGA.

Astyages, last king of Median empire (c. 584-550 bc). He was the son of Cyaxares and, according to Herodotus, grandfather of Cyrus by whom he was dethroned. Polyhistor (Eusebius) wrongly attributes the fall of Nineveh to A.

Astyanax, son of Hector and Andromache, sometimes called Scamandrius. At the sack of Troy he was cast from the ramparts, that he might never restore his grandfather's kingdom.

Astylar (Gk a, without; *stulos*, pillar), architectural term signifying without columns. Thus A. lt. buildings are in contradistinction from those buildings which are decorated with columns. A. design was introduced into England by Barry in the Travellers' clubhouse (1829) and Reform clubhouse (1837), London.

Asunción, or **Assumption**, cap. of the rep. of Paraguay, S. America. The city takes its name from the feast of the Assumption in 1537, which was the date of its foundation. The port, which is 950 m. from the sea, and is the country's prin. commercial, industrial, and cultural centre, has communication with Buenos Aires by steamers. There is a Brit.-owned railway (the Paraguay Central Railway) from A. to Encarnación, on the Alto Paraná. There is a wireless station. The climate is hot, but is not unhealthy. The city was once the seat of the Sp. gov. of the region, and contains the National Univ., important libraries, an airport, and many fine churches. The seat of the Paraguayan Rom. Catholic archbishopric is at A. Pop. (1955) 207,350; (with suburbs) 144,330.

Aswân (or **Assuan**), tn of Upper Egypt, on the Nile. It is the cap. of the most southerly prov. of Egypt, bearing the same name. It is popular as a health resort and tourist centre. Some remains of the anct city still exist in the form of granite columns and portions of the ruins of a temple. The once considerable trade in the products of the Sudan and Ethiopia has almost entirely ceased since the construction of the railway to Port Sudan. The granite quarries from which the anct Egyptian builders and sculptors drew their supplies are situated in the hills to the S. An unfinished obelisk 137 ft long and 14 ft thick is there. Blocks were detached by boring holes, driving wedges into them, and then wetting the wedges. On the is. of Elephantine is an anct Nilometer, and the A. Museum, containing objects found in Lower Nubia. The rock tombs of Elephantine of the princes and grandees are to be found in the hill on the opposite side of the riv. The ruined Coptic monastery of St Simeon is also in the

neighbourhood. During the Mahdia (1884-98) A. was strongly garrisoned by Egyptian and Brit. troops, but since a defeat of the khalfā the fixing of the Egyptian frontier farther S. lessened its military advantages. At A. is situated one of the greatest dams on the Nile.

On 19 July 1956 the U.S.A. informed the Egyptian Gov. that the financing of the High Dam at A. was 'not feasible in present circumstances.' A loan had been offered in Dec. 1955 in which the U.K., the U.S.A., and the World Bank offered to assist Egypt in this project, which was to have taken from 10 to 12 years to complete at a total cost of \$1,300,000,000. The U.K. associated itself with the U.S.A. in the withdrawal of the offer on 20 July 1956. The Suez Canal 'crisis' quickly followed.

results. Such reception is properly conditioned, in the case of land forces, upon an agreement by the fugitives to undergo disarmament on crossing the frontier, and internment within the neutral ter. as long as hostilities last.

Asymptote (Gk *a*, not; *sun*, together; *piplein*, to fall), straight line which a curve approaches nearer and nearer but never reaches. A familiar example is the ordinate of a hyperbola (q.v.).

Asyndeton (Gk *a*, not; *sun*, with; *dein*, to bind) is the omission for effect of connectives or conjunctions, as in Tennyson's line: 'Ah, miserable, false, unkind, untrue.' See also FIGURE OF SPEECH.

Asyūt, cap. of prov. of same name, Upper Egypt, near W. bank of R. Nile, 248 m. S. of Cairo. Area of prov. 812 sq. m. It is the residence of the governor.



THE DAM AT ASWÂN

Asylum, see INSANITY.

Asylum, *Right of*, a right, once familiar to students of international law, but now rare in Europe, which makes an ambas.'s house a sanctuary or 'city of refuge,' whether for himself and his household or for refugee criminals. As regards the last named, the claim has long been generally abandoned in practice, and to-day an ambas.'s house is no longer accurately described as part of the ter. of his own country. A criminal who takes refuge there can now be surrendered without formal extradition process, though whether an embassy can be entered without the ambas.'s permission is open to doubt. Entry and search are probably justifiable in those extreme cases which justify the arrest of the ambas. himself. The R. of A. was exercised in Greece in 1862 and in Spain in 1875. In Nov. 1956 Mr Nagy, a former Hungarian Prime Minister, sought sanctuary in the Yugoslav embassy. R. of A. has not entirely disappeared in S. America.

In another sense the R. of A. means that a neutral, consistently with his continuing friendship with both belligerents, is allowed to receive their troops or vessels within his ter. in circumstances which ensure that the use of his hospitality will not be aggressive in its

and is the largest tn and the most important commercial centre in Upper Egypt. The handicrafts for which it was formerly noted (pottery, inlaid wood, ivory carvings, leather and woven goods, and tulle shawls) are being rapidly ousted by European factory-made goods. The Mohammedan A. Institute was founded in 1915. Near by are the rock tombs of anct A. It is the chief seat of the Amer. Presbyterian Mission. One of the Nile dams has been constructed here. Pop. (prov.) 90,378 (1947).

Atabapo, riv. of Venezuela, joining the Guaviare at San Fernando de A., just before it enters the Orinoco after a course of 140 m. It forms part of the boundary between Colombia and Venezuela.

Atacama, prov. in N. Chile, area 30,843 sq. m., with a pop. of 76,360. There are some of the world's most valuable silver and copper mines in the prov. Salt is exported in large quantities. The A. desert is a vast stretch of barren country extending S. from Peru over the provs. of A., Antofagasta, and Tarapacá.

Atacamite, rare mineral originally found in the desert of Atacama, in S. America, and occurring in Saxony and on the slopes of Vesuvius and Etna. It is a copper oxychloride, $\text{CuCl}_2 \cdot 3\text{Cu}(\text{OH})_2$, crystallises in the orthorhombic system,

is usually green in colour, hardness 3, sp. gr. 3.7, and is worked as a copper ore.

Atafu, see TOKELAU.

Atagartis, see DERETO.

Atahualpa, son of Huayna Capac of Peru and 'last of the Incas.' He was deprived of the throne of Peru by the illegitimacy of his birth, as he was of the blood of the Incas only on his father's side, his mother being a captive princess of Quito. His father therefore was obliged to leave his throne to his legitimate son Huascar, but to his favourite son A. he left the newly conquered kingdom of Quito. A quarrel sprang up between the 2 brothers, and A. was victorious, but at the moment of his victory Pizarro, the Sp. pioneer, landed in Peru. On 15 Nov. 1532 he requested A., now Inca, to pay him a friendly state visit, but took him prisoner by a horrible massacre of his bodyguard. Treachery was followed by treachery, and after A. finally professed himself Christian he was strangled in 1533.

Atalanta, Arcadian huntress, daughter of Iasus and Clymene. Her father, desiring a son, exposed her in infancy, but she was reared by a she-wolf. She became a votary of Artemis (q.v.) and took part in the hunting of the Calydonian boar, when her father once more recognised her as his daughter. She was urged to marry, but being warned against it, and knowing that she was peerless in running, she made all suitors race her. He who lost must die; he who won would be her lord. Milanion won by a ruse. Aphrodite gave him 3 golden apples, which he let fall during the race, and A., overcome with their beauty, stooped to pick them up.

Ataman, see HETMAN.

Ata-Melik, whose complete name was Ala-eddin-ata-Melik al-Jowaini (c. 1227-1282), b. Jowain, near Nishapur, Khorasan. He became the confidant of Mangu Khan, and afterwards of Hulagu, by whom he was made prefect of Bagdad 1258. He was accused of peculation, and put into prison by Abaka Khan, the successor of Hulagu. He was, however, released by Sultan Ahmed, the successor of Abaka Khan. Ahmed was soon afterwards defeated by Argun, the son of Abaka Khan, and this news no doubt brought about the death of A.-M. He was the author of *Jehankushais* (The Conquest of the World), a hist. of the Moguls, and a MS., said to contain the greater part of it, is in the Royal Library at Paris.

Atanajua, see JAUA.

Ataroth, in E. of the Jordan, rebuilt by the tribe of Gad (Num. xxxii) and taken from the men of Gad by Mesha, King of Moab, c. 853 BC (2 Kings iii. 5-8). Generally identified with the ruins of Attarus, on the W. slope of Jebel Attarus, 7 m. NW. of Dhiban, where the famous Moabite stone of Mesha, recording the campaign, was found in 1869; it is now in the Louvre. Also the name of a tn on the border of Ephraim, not far from Jericho, but unidentified.

Atatürk, Mustafa Kemal (1880-1938), first president of the Turkish Rep., and

the maker of modern Turkey, b. Selanik (Salonica) of middle-class parents. He entered the army as an officer, and apart from some involvement in the Young Turk movement of 1908 pursued a normal military career until the First World War, when he was prominent as a div. commander in the Gallipoli campaign, as commander of the Turkish Second Army in the Caucasus, and for a time as commander in the Mesopotamian campaign. In 1919, during the allied occupation, he was appointed inspector of the army in E. Anatolia and there organised and led the nationalist movement which eventually turned the Greeks out of Smyrna and replaced the imperial gov. of the Sultan. He was elected President in 1923 and thereafter ruled Turkey as an all-powerful but benevolent dictator until his death. His main concern was the modernisation of Turkey, and to this end he introduced a number of social and administrative reforms which affected religion, justice, economy, education, language, the status of women, and dress. Considering the extent of the prevailing ignorance and prejudice his reforms met with surprisingly little opposition and were widely imitated in other under-developed countries. In foreign affairs he pursued a conciliatory policy, which contributed greatly to Turkey's prosperity and enabled her to maintain an honourable neutrality in the Second World War. His countrymen preserve his memory with a respect and gratitude amounting to veneration.

Ataulphus, or **Ataulf** (d. 415), King of the Visigoths and brother-in-law of Alaric I, whom he succeeded in 410. He invaded Gaul, and married Placidia, sister of the W. Emperor Honorius, in 414. He was assassinated in Spain.

Atavism (Lat. *atavus*, a great-great-grandfather), biological term used to denote a reversion to some remote ancestral type. It is a species of heredity common to animal and plant life, where some old family characteristic may make a sudden reappearance. Pure breeds may occasionally produce a common type or in horticulture cultivated species may revert to the common type. It is difficult to decide whether this is due to a concealed genetic factor, or whether (as in the appearance of coloured blood in species evolved through those with colourless blood, but with primitive ancestors of the coloured type) this merely implies a biochemical potential to produce the type of blood appropriate to the biology of the species.

Atbara, most N. trib. of the Nile. The A. was the scene of a battle fought between a Mahdist army under Mahmud and a Brit. army under Lord Kitchener (1898). The battle resulted in the capture of Mahmud and the rout of the Mahdists. This victory was followed by the decisive battle of Omdurman.

Atchafalaya River, in Louisiana, U.S.A., south-westerly distributary of the Red R. (q.v.), the one to the SE.—to the Mississippi R.—being the Old R. The A. R. starts 7 m. W. of the Mississippi and

winds 220 m. S. and SE. past Simmesport and Morgan City to Atchafalaya Bay of the Gulf of Mexico. Extensive guide-levée systems make it a run-off for flood waters of the Red R. and the Mississippi. The Gulf Intracoastal Waterway intersects it at Morgan City; above this it broadens into Grand Lake, c. 35 m. long and 2-6 m. wide.

Atchin, see **ACHIN**.

Atchison, **Topeka**, and **Santa Fe Railway**, U.S.A., a railway system extending through Missouri, Arkansas, Texas, Kansas, Colorado, New Mexico, Oklahoma, and Arizona. The system has now a total mileage of 9106.

Atē, daughter of Eris (Strife) and Zeus, Gk goddess who represents the infatuation that leads men to ruin. In tragedy her mission is moral, as the personification of retribution rather than of destruction.

Atel Crown, form of head-dress worn by Egyptian deities, consisting of a tall white cap, with a plume on each side, often with horizontal ram's horns at the base.

Atelectasis, see **COLLAPSE**, **PULMONARY**.

Ateles (Gk *atēls*, imperfect), genus of Central and S. Amer. primates known as spider-monkeys. They belong to the family Cebidae. The thumb is absent or vestigial (hence their name), the limbs long and very flexible, the tail long and much used in climbing. *A. paniscus*, the coaita, inhabits Brazil; *A. belzebuth*, the marimonda, Guiana.

Atellanae Fabulae, in anc. Rome, a sort of farce, Oscan in origin and so called from Atilla, near Capua. They were improvised burlesques from low life; but during the last cent. bc it became fashionable to present them after the performance of tragedies, and for this purpose they were given literary form by L. Pomponius and others. Certain stock characters appeared, e.g. Maccus the glutton, Bucco the fool, Pappus (Pantoloon), and Dossenus (Punch). A. F. were gradually superseded by the mime and disappeared about the time of Tiberius. See O. Ribbeck, *Comicorum Romanorum Fragmenta* (3rd ed.), 1898, and G. E. Duckworth, *The Nature of Roman Comedy*, 1952.

Ateshgah (place of fire), place of worship among the Guebres or Persian fire-worshippers, about 1 sq. m. in area, from the soil of which issues natural gas.

Atessa, It. tn in Abruzzi e Molise (q.v.), 24 m. SE. of Chieti (q.v.). It has a fine collegiate church. Pop. (com.) 10,000.

Ateste, see **ESTRE**.

Atfih (anc. **Aphroditopolis**), Egyptian tn situated on the R. b. of the Nile, in the gov. of Ghizeh. Pop. about 3000.

Ath (Flem. **Aat**), tn on the R. Dender in the prov. of Hainaut, Belgium. It was once a fortified stronghold but the fortress was dismantled in the 19th cent. and its ramparts superseded by boulevards. An 11th-cent. tower is now the sole medieval relic. Pop. 10,500.

Athabasca: 1. Before 1905 a great dist. in Canada was known as A. It covered an area of 251,000 sq. m. and was situated

in the NW. Ters. In 1905 parts of it were given to Saskatchewan and Alberta and in 1912 the rest became part of Manitoba.

2. Riv., affluent of the Mackenzie (also named the Elk or Reindeer R.), and likewise a lake in the prov. of Alberta, Canada. A. is a Cree Indian name, meaning 'where there are reeds,' referring to the muddy delta of the riv. where it falls into A. Lake. The source of the riv. is a small lake at the base of Mt Brown in the Rocky Mts, called the Committee's Punch-bowl. The A. flows from the mts in a N.-eastward direction, receiving many affluents and the drainage of the Lesser Slave Lake. An interesting feature of the riv. is the point where it takes the 'Great Rapids,' a long slope where the water flows steadily and without cascades. After a course of 550 m. the A. enters Lake A. The lake is shaped like a great bow with the horns pointing southward. The main affluent of the A. lake is called the Great Slave R., and is formed by the union of the A. and Peace R.s. The Great Slave R. in turn flows into the Great Slave Lake, and takes the name of the Mackenzie R. The A. (lake and riv.) are thus part of a great system which drains and waters a vast tract of Canada. The A.-Mackenzie, whose united length is 2700 m., together with the recipient lakes, provides most valuable transportation facilities.

3. Tn (incorporated 1911) of Alberta, Canada, 97 m. N. of Edmonton, and N. terminus of the Canadian National Railway on the A. branch. The tn was first visited by David Thompson in 1799 on his way from Lesser Slave Lake to Ile à la Croix Fort. In 1884 the Hudson's Bay Co. estab. a fort at A. Landing. Before the coming of the railways A. Landing was the last stopping place on the route to the far N.; transportation beyond the Landing was mostly by water. Gas was first discovered in the area in 1897, and the tn's gas wells were developed between 1911 and 1914. Industries are trapping, mixed farming, fur trading, brick making, grain growing, and legume crops. A. is the see of the Anglican diocese of A. Pop. 1220.

Athaliah, daughter of Ahab, King of Israel, and Jezebel, and wife of Jehoram, King of Judah. She inherited her mother's evil instincts, and under her the cult of Baal spread in Judah. On the death of her son Ahaziah, after a massacre of all her grandchildren except Joash, who escaped, she reigned in Israel for 6 years (841-836 bc). Joash deposed her.

Athamas, son of Aeolus, King of Thebes, married Nephele, and by her had Phryxus and Helle. He forsook Nephele for Ino, who bore him Learchus and Melicerta. Ino persecuted the children of Nephele, and Juno in revenge visited A. with madness, in which he slew his son Learchus.

Athanagild (d. 457), captain of the Sp. Goths. With the help of a Rom. force sent from Gaul by Justinian, he defeated and killed King Agila near Seville in 534.

A. then became King of the Goths in Spain, and endeavoured to drive his Roman allies out of Spain. He was unsuccessful, but reigned 14 years over that part of the country occupied by the Visigoths. Brunehaut, one of his two daughters, married Sigebert, King of Metz.

Athanaric (d. 381), Prince of the Visigoths. He engaged in a long unsuccessful campaign with the Emperor Valens, and had to make peace in 369. In 376 he was defeated by the Huns and took refuge with the Emperor Theodosius at Constantinople, where he d.

Athanasian Creed, see **ATHANASIUS** and **CREED**.

Athanasius (c. AD 296-373), saint and doctor of the Church, b. in Alexandria, led the resistance to the heresy of Arius (q.v.). He was prominent at the Council of Nicæa (325), and in the year following he was made patriarch of Alexandria and primate of Egypt. Arius had been banished after the Council of Nicæa; but the favourite sister of Constantine had leanings towards Arianism, and he was soon restored to favour. A. was urged to restore Arius to Christian communion, but refused. For this and for his treatment of 6 Arian bishops, especially Arsenius, he was tried and condemned at Tyre. He appealed to Constantine, but was banished for a little over 2 years to Trèves, whence he was restored by the younger Constantine on his accession (338). At a synod at Antioch it was decided that a bishop deposed by one synod could only be restored by an equal synod, and A. was again driven into exile. Part of this exile was spent in Rome, where he quickly gained the sympathies of the W. Church, and his innocence was upheld by the It. bishops in council. At a synod at Sardica, where representatives of the E. and W. met, an angry controversy occurred, and the beginnings of misunderstanding between E. and W. Churches are obvious for the first time. Constantine, Emperor of the W., under threat of a religious war, secured his restoration by Constantine in 349. In 351, however, Constantine was assassinated, and A. was again condemned in the Councils of Arles (353) and Milan (355). In 356 he was expelled from Alexandria, which was plundered by the imperial army. A. sojourned for 6 years in the deserts of Upper Egypt among the solitaries, who regarded him with the greatest respect and refused to betray him. In 362, under Julian the Apostate (q.v.), A. returned; but Julian hated him, and, in his own words, desired his death. A. eluded capture, and again took refuge in the monasteries of the Upper Nile. He returned in 363 under Jovian, and (save for a short break under Valens) remained to carry out his work in Egypt until 373. His death was the signal for the outbreak of religious persecution. He had been primate of Egypt for 43 years, and in exile 4 times. He led the Church during one of its most dangerous periods, and set an example of firmness. The so-called Athanasian creed embodies his

doctrines and beliefs, but was not heard of until some centuries after his death.

Athapasean, or **Athabasean**, linguistic family of N. Amer. Indians, inhabiting Canada, California, and the Rio Grande dist. It may be divided into 3 main branches: the N., originally not over 30,000 strong, in Alaska and Canada; the Pacific, originally about 20,000 strong, in Washington, Oregon, and California; and the S., at present about 30,000 strong, in Arizona, New Mexico, Texas, and parts of Mexico.

Athboy, mkt tn of co. Meath, Rep. of Ireland, on the Athboy R., 7 m. NW. of Trim. Pop. 500.

Atheism, denial of the existence of a god. A sect is very apt to charge its opponents with A. merely because their doctrines are not understood. Thus Xenophanes, who rejected the gods of the popular Gk religion, incurred the charge of A., though his attitude was almost monotheistic. Socrates, too, was charged with A. because he did not believe in the gods that the city worshipped. The early Christians were called atheists by the Romans, because they denied their gods and were at variance even with Judaism. Philosophic A. fails to find evidence of a god manifest in the universe. In Greece positive atheists were the followers of Democritus, Leucippus, and the materialistic schools. In Rome there were very many sceptics, but very few atheists. Lucretius was unique, standing apart from his age and from his race. His books *De Rerum Natura* (On the Nature of Things) is one of the most fervent denials of the divine ever penned. 'Gods' there are, but these 'gods' are not immortal, according to Lucretius, but only beings endowed with a happier and longer life than ordinary mortals. Lucretius had no followers at Rome, and his book was ignored for many generations. Modern A. falls into three classes: (1) **Dogmatic A.**, which positively asserts there is no God. The most active and widespread form of A. the world has ever known is the dogmatic A. of Communism, based on the Dialectical Materialism of Karl Marx (q.v.) and violently attacking religion for political and social-economic reasons as 'the opium of the people.' (2) **Sceptical**, which maintains that the finite mind of man is incapable of asserting whether God is or is not and so in practice ignores Him. Agnosticism (q.v.) may take this form, if it is radical. (3) **Critical**, which holds that the evidence for Theism is inadequate, and therefore rejects it as unproven. Rationalism is generally of this kind, though it is often combined with secret dogmatic pre-suppositions that are hostile to religion. Plato asserted that no one after adopting in his youth the doctrines of A. persisted in such doctrines in old age. In India the disbelief in the existence of God is common from very early times. Notably atheistic are the Sankhya system and the more modern Jainism. A. as a system did not have many adherents among the Jews. Still, there are traces of it, e.g. Jer. v. 12, 'They denied the Lord and

said, He is not'; and Ps. x. 4, 'The wicked in the haughtiness of his countenance says, "He will not require"; all his thoughts are, "There is no God."' See also RELIGION.

Atheists, Militant, in Soviet Russia, see MILITANT ATHEISTS.

Atheling, A.-S. title of nobility, confined in use by the 8th cent. to members of the royal family, i.e. kings and brothers and sons of kings.

Athelney, marsh at the junction of the Tone and Parrett, formerly an is., in Somerset, England. Here Alfred fled (AD 878) after being defeated by the Dan. invaders. On regaining his throne he founded a Benedictine monastery on the is. in commemoration of his retreat, and portions of it have been excavated. A jewel was found (1693) bearing Alfred's name, and is now preserved in the Ashmolean Museum (q.v.).

Athelstan (c. 895-939), Eng. king, son of Edward the Elder, and grandson of Alfred the Great. He succeeded to the thrones of Wessex and Mercia in 924, not without opposition. He annexed the kingdom of Northumbria, and then made tributary to himself the kings of Wales, Cumbria, and Scotland. These dependent kings later conspired with the Norsemen against him, but the battle of Brunanburh (937), a signal victory for A., put an end to the opposition. A. was the first king to unite England under one ruler and to establish a connection with Europe by marrying the female side of his line with European princes. The development of the king's council is an important feature of A.'s reign.

Athena, Gk goddess, frequently called Pallas A. or simply Pallas. Traditionally she was the daughter of Zeus by Metis (Wise Counsel), and sprang fully armed from Zeus's head after he had swallowed her mother. The theory of her origin now generally accepted is that of Nilsson. She was the pre-Hellenic patroness of Minoan and Mycenaean princes in their fortress palaces; and her later association with the snake and the olive is derived from the anct worship of a snake goddess and the tree cults of Minoan-Mycenaean religion. The Athenian acropolis was the site of a Mycenaean palace, and the invading Greeks adopted the goddess, together with the conquered citadel. It is possible that they identified her with a warlike virgin goddess of their own, from whom the name Pallas was derived. The chief characteristics of A. may be summarised as follows. (1) Under the titles *Polias* and *Poliuchus* she was patroness and defender of Athens, a natural consequence of her position in Mycenaean days. (2) She was the personification of wisdom, as expressed in the myth of her birth. From Mycenaean times she was probably thought of as protecting and guiding the handicrafts carried on in the royal palace; but with the increasing industrialisation of Athens her functions tended to embrace every kind of skill, and lastly the purely intellectual activities of her citizens. (3) She was a virgin goddess, despising love

and marriage; yet as guardian of the state she was concerned for the fertility of animal and vegetable life. (4) She was a goddess of war, a position due almost entirely to the Gk invaders and the fusion of A. with their national goddess. Her prin. festival at Athens was the *Panathenaea* in the Aug. of every fourth year; and her temple the Parthenon, the most celebrated in the world. The Romans identified A. with their goddess Minerva.

Athenaeum: 1. In general a place or temple sacred to Athena. The name was especially given to a literary and scientific school founded by Hadrian at Rome c. AD 133.

2. A similar institution founded at Rome by Hadrian in 135, chiefly for instructional courses in law, rhetoric, and philosophy. Afterwards known as the *Schola Romana*, it lasted into the 5th cent. AD. The name thus came to be applied through the ages to various academies and learned societies.

'Athenaeum', literary weekly jour. started by James Silk Buckingham in 1828. Two years later it passed to the sole control of Charles Wentworth Dilke, who in 1831 successfully reduced the price from 8d. to 4d. Hogg the Ettrick Shepherd, Leigh Hunt, and Wm Roscoe were among the contributors. Dilke also tried to revolutionise journalistic principles, asking no favour of any publisher and refusing to allow his criticisms to be biased. He resigned the editorship in 1846. The A. was 'the first literary paper to make honesty its aim.' After nearly a century of existence it was incorporated in the weekly *Nation* (1921), later called the *Nation and A.* The paper was amalgamated in 1931 with the *New Statesman* (q.v.).

Athenaeum Club, famous institution in Pall Mall, founded in 1824 'for the association of individuals known for their literary or scientific attainments, artists of eminence in any class of the Fine Arts, noblemen and gentlemen distinguished as liberal patrons of Science, Literature, and the Arts.' Membership is attained by the vote of the committee. The club consists of 1750 members, who pay a yearly subscription of 21 guineas, with an entrance fee of 40 guineas. Attached to the club is a fine library. See CLUB.

Athenaeus, Gk writer, probably contemporary with Archimedes. A work by him on engines of war (*Peri Mēchanēmōnōn*) is extant, and printed in the collection of Thévenot. This work is addressed to M. Marcellus, supposed to be the conqueror of Syracuse.

Athenaeus (fl. AD 200), Gk writer, b. at Naucratis in Egypt; studied at Alexandria and Rome. He wrote a miscellany called the *Banquet of Sophists* in the form of conversations of learned guests at a prolonged feast. The book is full of valuable information concerning Gk letters and science, and is one of the best sources for fragments of lost comedies, etc. Of the original 30 books only 15 and an abridgment have survived; these have been ed. with a trans. by C. B. Gulick (1927).

Athenaeus of Attalia, physician who fl.

in Rome about the middle of the 1st cent. of our era, and estab. the Pneumatic school in medicine. A few fragments of his writings are preserved by Oribasius and Aetius, and allusions are made to his opinions in the writings of Galen. His theory, adopted by sev. other distinguished physicians (e.g. Aretaeus), derived its name from the *pneuma*, or spirit, a notion of which these physicians made frequent use in their explanation of life and disease. This *pneuma* formed an important principle in the physical science of the Stoic philosophers, from whom the Pneumatists seem to have derived it. The very scanty remains of the Pneumatic doctrine do not enable us to judge whether its *spirit* resembled the *vital principle* of some modern physiologists; nor can we appreciate in what manner the Pneumatists conceived the efficacy of this *spirit* as connected with those principles which they admitted in common with other anc. schools, the elementary qualities, heat and cold, which they called active principles, and dryness and moisture, which they termed passive principles.

Athenagoras, Gk Christian apologist, who fl. in the 2nd cent. AD, b. Athens, and taught there and at Alexandria. Best known by his *Legatio pro Christianis*, addressed to the Emperor Marcus Aurelius. He also wrote a treatise on the resurrection of the body. Works trans. by Humphreys, 1714.

Athenais, see EUDOCIA.

Athenion, Sicilian slave-leader in the second Servile war, 102 BC. He assumed the title and state of a king, and told his followers that he was destined to reign over Sicily. He laid siege to Lilybaeum, but failed in his attempt. He then joined Salvius, another slave-leader, who had assumed the name of Tryphon. The Senate sent Lucullus to subdue them, and although he was at first successful he was defeated when he laid siege to Triocala. Tryphon d., and A. succeeded him, but was defeated and slain by the consul Marius Aquilius in 101 BC. Aquilius ended the war in 99 BC.

Athenion (1st cent. BC), son of a Peripatetic philosopher of the same name, by an Egyptian slave. He was set free, opened a school in Athens, and ultimately became tyrant of that city. He helped Mithridates in his wars against the Romans, and with Archelaus, the general of the King of Pontus, held Athens against Sulla, who afterwards put him to death.

Athenodorus, Gk sculptor, who executed the statues of Apollo and Zeus commemorating the battle of Aegospotami.

Athenodorus, Rhodian sculptor of 1st cent. BC. He was one of the three who produced the famous 'Laocöon,' the others being Hagesandros and Polydorus.

Athenodorus, of Tarsus, a Stoic philosopher surnamed Cordylion, was keeper of the library at Pergamum; afterwards removed to Rome, where he lived with M. Cato, at whose house he d. c. 45 BC.

Athenodorus, of Tarsus (74 BC-AD 7), also a Stoic philosopher, surnamed

Cananites from Canana near Tarsus in Cilicia, the bp. of his father. Taught at Apollonia in Epirus, where the young Octavius (later the Emperor Augustus) was one of his disciples. St Paul must have been acquainted with his teaching, to which we may perhaps attribute a number of striking resemblances between the Apostle and Seneca.

Athenry, par. and mkt tn of Rep. of Ireland, in Galway co., 10 m. NW. of Loughrea. Friday is the market day. Pop. 1200.

Athens, cap. of anc. Attica and modern Greece, situated on the Attic plain, 44 m. from its harbour, Piraeus, on the gulf of Aegina. The plain is surrounded by hills: Mt Hymettus lying to the E., Pentellicus to the NE., Parnes to the NW., and Aegaleus to the W. and sloping SW. to the Saronic Gulf. It is crossed by sev. lower ridges, partly occupied by the city itself. The greatest height of these, Mt Lycabettus, directly overhangs the city, within which are the rocky masses forming the Acropolis and Areopagus. The plain is watered by the Ilissus and Cephissus, both irregular mt streams. A. is approached on the W. by the 'Sacred Way,' over the plain of Eleusis, and on the SW. from Piraeus, over what was formerly a swamp, and there are railways to Piraeus, Laurium, and Corinth and a tram-line to Phaleron. This last was the first harbour of A., but, together with Munychia and Zea, it was early replaced by Piraeus, now one of the chief ports of the Mediterranean. The city was connected with the ports by the famous 'long walls.'

The original site of the city was undoubtedly the Acropolis, on the summit of which have been found traces of a prehistoric wall. Buildings soon extended to the S. and W. of the hill, and this city, the foundation of which is ascribed to Theseus, was enclosed by a strong wall with 9 gates, portions of which still remain. There can also be traced the course of the great wall of Themistocles, built immediately after the Persian wars, 479 BC, and the gate of Hadrian probably marks the limit of the extension to the E. made under the Emperor Hadrian. The modern city lies mainly to the N. and E. of the Acropolis, in the depression between it and Mt Lycabettus. But the increase in pop. during the present cent., owing to some extent to the arrival of refugees from Asia Minor, has led to the building of many suburbs, Mt Lycabettus being now almost surrounded by buildings. Approaching the Acropolis the streets become narrow and cobbled, and open drains run down the middle of some of them. A. has been almost entirely rebuilt since it became the cap. of the new kingdom of Greece on the withdrawal of the Turkish garrison in 1834, and is now a regular and attractive city, extending in the form of a semicircle, and divided into 6 dists. It is connected with the older part by the 2 main thoroughfares of Hermes Street and Aeolus Street, intersecting at Constitution Square the site of the royal palace,

1834-8. Omonia Plateia (Place of Harmony) is the business centre, but it belies its name, for it is the noisiest spot in the city. The square is surrounded by cafés which usually remain open all night. Here, too, is the entrance to the underground station, and 7 streets run into the square. Numerous wide boulevards, the most important of which are Piræus Street, Athens Street, Stadium Street, and Univ. Street, radiate from the central Place de la Concorde, and contain fine gov. and univ. buildings, and the offices of the many archaeological and other societies for which A. is famous. There are 2 univs. at A., the National and the Capodistria. It is the see of a metropolitan, and possesses an ugly cathedral built in 1855. Before the capture of A. by the Turks,

Pnyx, also near the Acropolis. Just outside the city to the SE. are the ruins of the temple of Olympian Zeus, begun by Pisistratus, and completed by Antiochus Epiphanes and under the Emperor Hadrian. The Stadium, on the banks of the Ilissus, was built by Lycurgus, 330 BC, rebuilt by Herodotus Atticus, AD 140, and after being largely destroyed in the Middle Ages was restored in 1905. Thanks to the archaeological societies which have made A. their H.Q., the Acropolis has been entirely cleared of Turkish and medieval remains, and many of the anc. buildings have been restored as nearly as possible to their former state. The Agora has been completely excavated by the Amer. School of Classical Studies.



ATHENS FROM THE ACROPOLIS

E.N.A.

the Parthenon was the cathedral. The Theseum and Erechtheum were also converted into churches in the Middle Ages.

The antiquities of A. are probably unequalled in the world. The most famous is the Parthenon, dating from the reconstruction of A. after the Persian wars. It is built of white marble, 228 ft long and 100 ft wide, ornamented by Phedias, and surrounded by 46 Doric columns. Even in its ruins it is the most perfect specimen of Gk architecture extant. To the N. of the Parthenon is the Erechtheum, which contained the statue and sacred olive of Athena, and had a wonderful portico of Caryatides. At the W. end of the Acropolis, just above the great gateway (the Propylæa), stands the temple of Athena Nike, or Apteros Nike (Wingless Victory). At the foot of the hill to the N. is the so-called Theseum, actually a temple of Hephaestus, dating from the time of Pericles, and in excellent preservation, and to the S. the temple of Dionysus and the Odeon of Herodes Atticus. The Areopagus, or Mars's Hill, was the meeting-place of the great council of that name, and popular meetings were held on the mound of the

The early hist. of A. is very obscure. It seems to have been originally one of numerous petty states, but early emerges as the cap. of Attica, traditionally united under Theseus. The earliest form of gov. was a monarchy, but the powers of the king were gradually limited by the nobles (Eupatridæ), and the rule of archons (q.v.) represents a period of 'aristocracy.' The citizens seem to have been divided into 4 tribes, each consisting of 3 brotherhoods. The growth of the democracy was gradual, being assisted by the legislation of Draco, 621 BC, Solon, 592 BC, and Cleisthenes, c. 500 BC. A. took a leading part in repelling the Persian invasion of 490 BC, and in the final defeat of Xerxes, 480-479 BC, and after this, by the estab. of the Delian League, became mistress of the whole of the Gk states. The golden age of Athenian power and culture, 480-430 BC, which reached its highest point under Pericles, witnessed the production of its finest buildings, its most perfect sculpture, by Phedias, and the poetic drama of Aeschylus, Sophocles, and Euripides. Its prosperity began to decline from the end of the Peloponnesian war, 403 BC, when

Sparta became the premier state of Greece, and suffered still further by the victories of Macedonia, culminating in the battle of Chaeronea, 338. Its intellectual supremacy, however, long outlived its temporal power. In 146 BC A., together with the rest of Greece, became part of the Rom. Empire. Under Rom. rule it fl., and became a great educational centre, declining, however, with the spread of Christianity. At the fall of the empire it passed under Byzantine rule, and early in the 13th cent. became the seat of a Frankish duchy. In the mid 15th cent. A. was captured by the Turks, and practically disappeared from European hist. for cents. Except for a brief period of Venetian rule, 1687-1690, it remained in the hands of the Turks till its capture by the Gk patriotic party in 1822. It was retaken by the Turks, 1826-7, but became cap. of the new kingdom in 1834. A. has become a centre of archaeological research, the chief institutions being the Fr. School of Archaeology, 1846; the Ger. Imperial Archaeological Institute, 1874; the Amer. School of Classical Studies, 1882; and the Brit. School of Archaeology, 1883. The pop. of anc't A. in its time of greatest prosperity was about 300,000; in the 16th cent. it is said to have fallen to 12,000. In 1955 it was about 565,000 (est.). Public works of importance include the A.-Piraeus electric light and power scheme and the A.-Piraeus water supply scheme. As to the former, the Gk Gov. concluded a contract in 1925 with an Anglo-Hellenic group for operation of power by various transport services in the A.-Piraeus dist. The question of an adequate water supply for A. had been discussed for some 40 years, when, in 1926, the Gk Gov. decided in favour of a scheme for a dam near Marathon to hold up the waters of the Charadros and Varnava R.s; and eventually a contract was given to an Amer. company, the Ulen Water Co. The dam is nearly 300 yds long and the reservoir holds over 40 million cub. ft. of water. A tunnel over 13 m. long leads the supply as far as Chelidono, where the dam station is estab. In the sphere of education, the A. Academy was inaugurated in 1926; the statutes of the Academy provide for instruction in letters and fine arts, moral and political sciences, and positive sciences. Recently the A.-Piraeus electric railways, which have now been extended to Perama, were taken over by the Hellenic Electric Railway Co. Some quarters of A. became considerably extended after 1922 owing to the large immigration of refugees from Asia Minor following the Gk debacle in the war against Turkey, 1921-2. The quarter especially affected was Patesia. In the Second World War the Germans entered A. on 27 April 1941. Brit. forces entered the city on 14 Oct. 1944. On 5 Dec. fighting began in A. between E.L.A.S. troops and Brit. and Gk regulars and the city was not out of danger for 3 weeks. On 25 Dec. Mr Churchill and Mr Eden arrived for political discussions and 5

days later the Archbishop of A. became regent of Greece. There was little further fighting in A. itself. Superficially there is now little trace of war damage, but A. still includes appalling slums.

See E. Abbott, *Pericles and the Golden Age of Athens*, 1891; Sir J. G. Frazer, *Pausanias* (trans.), 1898; E. A. Gardner, *Ancient Athens*, 1902; C. H. Weller, *The Monuments of Athens*, 1913; W. S. Davis, *A Day in Old Athens*, 1914; T. G. Tucker, *Life in Ancient Athens*, 1930; W. Judeich, *Topographie von Athen*, 1931; R. J. Bonner, *Aspects of Athenian Democracy*, 1933; and bibliography for ACROPOLIS.

Athens: 1. Cap. of Clarke co., Georgia, U.S.A., 60 m. ENE. of Atlanta. It is the seat of the univ. of Georgia, and an important cotton market and manufacturing centre (textiles, tyre fabric, fertiliser, cotton-seed oil, metal and wood products, canned foods). Pop. 28,180.

2. City of A. co., Ohio, U.S.A., on Hocking R., 40 m. W. of Marietta. It is the seat of Ohio Univ. and the site of a state hospital for the insane. Pop. 11,700.

Atherfield Clay, stratigraphical name of beds of clay forming the base of the Lower Greensand, of Lower Cretaceous age. Exposed in the Weald, Dorset, and the Is. of Wight. Named after Atherfield in the Is. of Wight. Average thickness is 60 ft.

Atherstone, Edwin (1788-1872), poet, b. Nottingham. His works were planned on an imposing scale, his chief poem, *The Fall of Nineveh*, consisting of 30 books, and appearing by instalments from 1828 to 1868. He also wrote 2 novels.

Atherstone, tn of Warwickshire, England, 7 m. SE. of Tamworth. The prin. industry is hat-making. Close by are the ruins of the Cistercian abbey of Merevale, founded 1149. The tn stands on the Rom. Watling Street, equidistant from London, Liverpool, and Lincoln. Pop. 5824.

Atherton, Charles Gordon (1804-53), Amer. politician, b. Amherst, New Hampshire; graduated at Harvard, 1822. After serving in the state legislature and as speaker of the Lower House, he was elected to Congress, 1836. In 1838 he introduced the famous resolution, 'That all petitions relating to slavery, or its abolition, be laid on the table without debate,' which was passed by 120 to 78. He was elected to the Senate in 1843 and in 1852.

Atherton, Gertrude Franklin (1857-1948), novelist, b. San Francisco. Her maiden name was Hunt, and she was a great-grandniece of Benjamin Franklin (q.v.). In 1876 she married George H. B. A., and on his death 4 years later she started a writing career. She lived for 7 years in England and for 6 in Munich, and was made a Chevalier of the Legion of Honour. Among her best-known novels are *The Conqueror*, 1902, *Rezánov*, 1906, *Tower of Ivory*, 1910, *Black Ozen*, 1923, *The Immortal Marriage*, 1927, and *Dido, Queen of Hearts*, 1929. *Adventures of a Novelist*, 1932, is autobiographical.

Atherton, tn of Lancs, England, 13 m.

NW. of Manchester. Contains large cotton spinning factories, iron foundries, and collieries. There were formerly many silk-weaving mills. The nonconformist chapel is famous for its minister, 'General' James Wood, who raised a troop against the Pretender, 1715. Pop. 20,600.

Athesis, see ADIGE.

Athi River, see SABAKI.

Athias, Joseph ben Abraham, Jewish printer at Amsterdam, who *d.* in 1700. With the help of the most distinguished scholars at Amsterdam, he compared the old eds. and MSS. of the Heb. Bible, and pub. a new ed. in 1661, the summaries and preface of which were written by Jan Leusden. A second ed. was pub. in 1667, with many corrections.

Athletics in the form of public games date from the earliest civilisations. The anc. Greeks held 4 great festivals at which athletic contests were prominent. (1) The *Olympic Games*, held every fourth year, were of unknown antiquity, but were reckoned in much later times to date from 776 BC. The most important contests were the foot-race, a wrestling match, the pentathlon (leaping, running, throwing the discus, throwing the spear, and wrestling), boxing, and the chariot race. The festival was abolished by Theodosius in AD 394. (2) The *Pythian Games* took place at Delphi, first at 8-yearly intervals and afterwards at the end of every fourth year. They dated from before the 6th cent. BC. (3) The *Nemean Games*, at Nemea in Argolis, were biennial, dating from 516 BC. Finally, (4) the *Isthmian Games*, held near Corinth in the first and third year of each Olympiad, began not later than the early 6th cent. BC, and perhaps earlier. The first and third of these festivals were in honour of Zeus, the second and fourth in honour of Apollo and Poseidon respectively.

The Romans, a coarser and more cosmopolitan people, found their chief pleasure in those disgusting spectacles of the amphitheatre which cannot be described as A. Athletic contests, however, took place at the following festivals: (1) *Ludi Magni*, of early republican origin; (2) *Ludi Apollinares*, instituted in 212 and subsequently ann.; (3) *Ludi Megalenses* (in honour of Cybele), first held in 204 and ann. from 191 BC; (4) *Ludi Saeculares* at the beginning of each *saeculum*, which was interpreted variously as 100 or 110 years; and (5) *Ludi Augustales* (see AUGUSTALES), instituted in 11 BC.

Public games in the Middle Ages took the form of tournaments (q.v.), but archery and wrestling were the sport of the people, as the lists were the pastime of the nobility. Henry VIII, however, did not disdain to excel at hammer-throwing or 'casting the barre,' but under Edward III weight-putting was forbidden as interfering with archery. Later under Charles II professional races for wagers began to be popular, and this aroused amateur enthusiasm, leading to the renaissance of amateur A. in the 19th cent. In 1850 a movement was started to organise sports meetings at the colleges of the univs. of Oxford and

Cambridge. As a result of this the first inter-univ. contest took place in 1864, each side winning 4 of the 8 events. Meanwhile the London Athletic Club and others had been formed, and finally in 1880 the need for a central authority gave rise to the Amateur Athletic Association. Since then the A.A.A. has organised a yearly championship, now held in London.

As regards modern A., we must confine ourselves under this head to the track and field sports. Cricket, football, etc., will be found dealt with under their various heads. Modern A. may be said to have begun with the revival of the Olympic Games (q.v.), celebrated at Athens in 1896 as the result of the activities and enthusiasm of the Baron Pierre de Coubertin. One ideal of his was to promote through sport an international good feeling, but, the First World War having interrupted the quadrennial succession of the games, it was only in the ninth Olympiad of 1928 that Coubertin's idea had begun to be realised. This aim was subordinated in the eleventh Olympiad at Berlin in 1936 to the propaganda of National Socialism; but a welcome return to the true spirit of the games was a feature of the 1948 Olympiad at London (the first to be held in Great Britain since 1908) when public interest and enthusiasm brought one and a half million spectators.

The eighth Olympiad at Paris in 1924 was remarkable for the performances of Paavo Nurmi, the great Finnish runner. He won 4 titles during these Olympic Games. In the course of his career Nurmi set up world records for every distance from 1500 metres to one hr, yet none stands to-day.

It was not until the Olympic Games were held in Nurmi's native city of Helsinki in 1952 that another great distance runner, Emil Zatopek, Czechoslovakia, emerged. He won the 5000, 10,000 metres, and marathon in the space of 8 days. Four years later in Melbourne V. P. Kuts, U.S.S.R., won the 5000 and 10,000 metres, but did not run in the marathon.

America has produced the majority of the world's great athletes and their most famous Olympian is Jesse Owens, who won gold medals in the 100, 200 metres, long jump, and 4×100 metres relay at Berlin in 1936. His long-jump performance of 26 ft 8½ in. in 1935 has stood as a world record longer than any other in track and field. The creation of new world records is a great stimulant in A. and there is no sign of a barrier being reached, although they naturally become more difficult over shorter distances.

S. Iharos, Hungary, estab. new times at 5 distances between 1500 and 10,000 metres in 1955 and 1956, yet many of these were broken within months of being set up.

A. is divided into track and field events and it is easier to deal with them separately.

Track events. World records are in metres and yds. Here are the metric times first: 100 metres: 10.1 sec., W. F.

Williams, L. King, I. Murchinson (all U.S.A.), 1956; 200 metres: 20 sec., D. Sime (U.S.A.), 1956; 400 metres: 45.2 sec., L. W. Jones (U.S.A.), 1956; 800 metres: 1 min. 45.7 sec., R. Moens (Belgium), 1955; 1000 metres: 2 min. 19.0 sec., I. Rozsavolgyi (Hungary), A. Boysen (Norway), 1955; 1500 metres: 3 min. 40.6 sec., I. Rozsavolgyi, 1956; 2000 metres: 5 min. 0.2 sec., I. Rozsavolgyi, 1955; 3000 metres: 7 min. 52.8 sec., D. A. G. Pirie (Great Britain), 1956; 5000 metres: 13 min. 36.8 sec., D. A. G. Pirie, 1956; 10,000 metres: 28 min. 30.4 sec., V. P. Kuts (U.S.S.R.), 1956; 20,000 metres: 59 min. 51.8 sec., E. Zatopek (Czechoslovakia), 1951; 25,000 metres: 1 hr 16 min. 36.4 sec., E. Zatopek, 1955; 30,000 metres: 1 hr 35 min. 3.6 sec., A. Viskari (Finland), 1956; 3000 metres steeplechase: 8 min. 35.4 sec., S. Rozsnyoi (Hungary), 1956; 100 yds: 9.3 sec., M. E. Patton (U.S.A.), 1948, H. D. Hogan (Australia), 1954, J. J. Golliday, 1955; L. King, D. Sime (both U.S.A.), 1956; 220 yds: 20 sec., D. Sime, 1956; 440 yds: 45.8 sec., J. G. Lea (U.S.A.), 1956; 880 yds: 1 min. 47.5 sec., L. V. Spurrier (U.S.A.), 1955; 1 m.: 3 min. 57.2 sec., D. Ibbotson (Great Britain), 1957; 2 m.: 8 min. 33.4 sec., S. Iharos (Hungary), 1955; 3 m.: 13 min. 14.2 sec., S. Iharos, 1955; 6 m.: 27 min. 43.8 sec., S. Iharos, 1956; 10 m.: 48 min. 12 sec., E. Zatopek (Czechoslovakia), 1951; 15 m.: 1 hr 14 min. 1.0 sec., E. Zatopek, 1955; 1 hr: 12 m. 810 yds (20,052 metres), E. Zatopek, 1951.

The mile has always been the Blue Riband race in A. As the world record crept down to near 4 min. the publicity which attended every mile event where top-class performers competed was tremendous. This feat was often described as the Everest of A. Roger Bannister (q.v.) was the first man to break the barrier at Oxford on 6 May 1954, clocking 3 min. 59.4 sec. In less than 3 years 9 other men beat 4 min. for the mile, so proving once again that every record is only made to be broken.

W. G. George, the famous Brit. runner of the last cent., was credited with the first accepted mile record when he ran the distance in 4 min. 18.4 sec. (1884). This stood until T. P. Conneff (U.S.A.) covered the distance in 4 min. 17.8 sec. The gradual succession of records since then is shown in the following list (which is not exhaustive, because the previous record may have been beaten more than once in any given year): F. E. Bacon (Great Britain), 4 min. 17 sec. (1895); T. P. Conneff (U.S.A.), 4 min. 15.6 sec. (1895); J. P. Jones (U.S.A.), 4 min. 15.4 sec. (1911); J. P. Jones, 4 min. 14.4 sec. (1913); N. S. Taber (U.S.A.), 4 min. 12.6 sec. (1915); P. Nurmi (Finland), 4 min. 10.4 sec. (1923); J. Ladoumègue (France), 4 min. 9.2 sec. (1931); J. E. Lovelock (New Zealand), 4 min. 7.6 sec. (1933); G. Cunningham (U.S.A.), 4 min. 6.8 sec. (1934); S. G. Wooderson (Great Britain), 4 min. 6.4 sec. (1937); G. Haegg (Sweden), 4 min. 4.6 sec. (1942); A. Andersson (Sweden), 4 min. 2.6 sec. (1943); A. Andersson, 4 min. 1.6 sec. (1944); G.

Haegg, 4 min. 1.4 sec. (1945); R. G. Bannister (Great Britain), 3 min. 59.4 sec. (1954); J. Landy (Australia), 3 min. 58 sec. (1954); D. Ibbotson (Great Britain), 3 min. 57.2 sec. (1957).

Landy has broken the 4-min. mile 6 times and Bannister twice. Others who have achieved a time under the magic 4 min. include C. J. Chataway, B. S. Hewson, D. Ibbotson (Great Britain); I. Rozsavolgyi, L. Tabori (Hungary); R. Delaney (Ireland); G. Nielsen (Denmark); J. Bailey (Australia).

Brit. running records (i.e. records made in Great Britain by athletes of any nationality): 100 yds: 9.6 sec., D. Conwell (U.S.A.), E. McDonald Bailey (Trinidad), 1947; L. Remigino (U.S.A.), 1954; 220 yds: 20.9 sec., H. H. McKenley (Jamaica), 1952; 440 yds: 46.8 sec., V. G. Rhoden (Jamaica), 1952; 880 yds: 1 min. 48.6 sec., B. S. Hewson (Great Britain), 1955; 1 m.: 3 min. 59 sec., L. Tabori (Hungary), 1955; 2 m.: 8 min. 33.4 sec., S. Iharos (Hungary), 1955; 3 m.: 13 min. 23.2 sec., C. J. Chataway (Great Britain), 1955; 6 m.: 28 min. 13.6 sec., K. L. Norris (Great Britain), 1956; 10 m.: 49 min. 53.2 sec., P. Norris (Great Britain), 1956; 15 m.: 1 hr 17 min. 25 sec., J. C. Heywood (Great Britain), 1956; 1 hr: 12 m. 69 yds, P. Norris (Great Britain), 1956.

Hurdling. The U.S.A. again proved their domination of the hurdling events by placing the first 3 men in both the 110 metres and 400 metres events at the Melbourne 1956 Olympic Games. Earlier in that year 2 Americans, G. A. Davis and S. E. Southern, became the first men in hist. to break 50 sec. for the 400 metres event. This ended a short reign of supremacy enjoyed by Russian athletes in an event often described as the 'man killer' of the track. World records: 110 metres and 120 yds (3 ft 6 in.): 13.4 sec., J. W. Davies (U.S.A.), 1956; 200 metres and 220 yds (2 ft 6 in.): 22.2 sec., D. W. Sime (U.S.A.), 1956; 400 metres (3 ft): 49.5 sec., G. A. Davis (U.S.A.), 1956; 440 yds (3 ft): 51.3 sec., Y. Lituyev (U.S.S.R.), 1954. Brit. hurdling records (all comers): 120 yds: 13.9 sec., W. F. Porter (1948), H. Dillard (1952) (both U.S.A.); 220 yds (bend): 23.7 sec., P. A. L. Vine (Great Britain), 1955; (straight course): 23.3 sec., P. B. Hildreth (Great Britain), 1955; 440 yds: 51.3 sec., Y. Lituyev (U.S.S.R.), 1954. See also OLYMPIC GAMES and RUNNING AND HURDLING.

Field Events. Track racing will always be the most popular section of A. with spectators but field events are rapidly gaining their own audience. This is partly due to the better technique of many athletes, which has brought about spectacular improvements, and to the better planning of stadiums. Already the 15-ft pole vault, 7-ft high jump, and 200-ft hammer throw have been achieved.

World records: high jump: 7 ft 0½ in., C. E. Dumas (U.S.A.), 1956; pole vault: 15 ft 7½ in., C. A. Warmordam (U.S.A.), 1942; long jump: 26 ft 8½ in., J. C. Owens (U.S.A.), 1935; hop, step, jump: 54 ft 4 in., A. F. da Silva (Brazil), 1955; shot putt

(16 lb.): 63 ft 2 in., W. P. O'Brien (U.S.A.), 1956; discus throw (4½ lb. brass plate): 194 ft 6 in., F. E. Gordien (U.S.A.), 1953; hammer throw (16 lb. chained ball): 224 ft 10½ in., H. V. Connolly (U.S.A.), 1956; javelin throw: 281 ft 2½ in., E. Danielsen (Norway), 1956; decathlon (ten events in two days): 7985 points, R. Johnson (U.S.A.), 1955.

In 1912, 1920, and 1928 cross-country racing was included in the Olympic Games, but thereafter was omitted as unsuitable for a summer programme.

Walking has always been a controversial event owing to the number of disqualifications in international tournaments. This is the reason why the 10,000 metres track event is no longer included in the Olympic Games. Instead both walking races—20,000 and 50,000 metres—are on the road. The most successful world walker in recent years is V. Hardino (Sweden). G. E. Larner has held the Brit. record for 2 m. (13 min. 11.4 sec.) since 1904.

The tug-of-war is still a popular event at the A.A.A. championships but is seldom performed outside Britain.

Paper-chases were the origin of *cross-country running* (q.v.), but are nowadays rather falling out of favour except with schoolboys. Cross-country races have increased in popularity with athletes realising all-the-year-round competition is essential. The sport is governed by the National Cross-country Union and the season lasts from Sept. to Mar. See also **CABER; DISCUS; HAMMER; OLYMPIC GAMES; PUTTING THE WEIGHT.**

Women's Events. The ninth Olympiad at Amsterdam will be remembered as the first to include events for women athletes. They included the 100, 800 metres, 4 × 100 metres relay, high jump, and the discus. Since then the 800 metres has been eliminated, but the 200 metres, long jump, 80-metre hurdles, shot putt, and javelin have been added. Women now play an important role in the games. They have produced a number of great athletes through the years. The most famous is Fanny Blankers-Koen, 'the flying Dutchwoman,' who won the 100, 200 metres, 80 metres hurdles, and was a member of Holland's victorious relay team at London in 1948. Her 2 Olympic sprint titles were won by the Australian Marjorie Jackson-Nelson at Helsinki in 1952. Four years later another Australian girl, Betty Cuthbert, aged 18, won the 100 and 200 metres. Record breaking is as much a feature with the women as with men. Women's world records are as follows: 60 metres: 7.3 sec., S. Walasiewiczówna (Poland), 1933; 100 metres: 11.3 sec., S. Delahunty-Strickland (Australia), 1955; 200 metres: 23.2 sec., B. Cuthbert (Australia), 1956; 800 metres: 2 min. 6.6 sec., N. Otkalenko (U.S.S.R.), 1954; 100 yds: 10.4 sec., M. Jackson-Nelson (Australia), 1952; 220 yds: 23.6 sec., M. Itkina (U.S.S.R.), 1956; 880 yds: 2 min. 6.6 sec., N. Otkalenko (U.S.S.R.), 1956; high jump: 5 ft 9½ in., M. McDaniel (U.S.A.), 1956; long jump: 20 ft 10 in., E. Krzesinska (Poland), 1956; N. Dvalishvili (U.S.S.R.), 1956; shot putt: 54 ft 11½ in., G. Zyblina (U.S.S.R.), 1956;

discus throw: 187 ft 1½ in., N. Dumbadze (U.S.S.R.), 1952; javelin throw: 182 ft 0 in., N. Konyayeva (U.S.S.R.), 1954.

France gave the lead to women's A. when the Federation Sportive Féminine Internationale was formed in 1921. A year later the Women's Amateur Athletic Association was founded. Under the auspices of the F.S.F.I. the first women's world championships were held in Paris in 1924. In those early days women taking part in A. were severely criticised in some quarters.

See H. M. and A. Abrahams, *Training for Athletes*, 1928; D. G. A. Lowe, *Track and Field Athletics*, 1947; F. A. M. Webster, *Great Moments in Athletics*, 1947, and *Athletics: Teaching and Training*, 1948; Franz Stampfl, *On Running*, 1955; members of the Achilles Club, *Athletics*, 1955.

Athlone, Alexander Augustus Frederick William Alfred George Cambridge, 1st Earl of (1874–1957), administrator, b. Kensington Palace, third son of the Duke of Teck. Queen Mary, wife of George V, was his sister. He married Princess Alice, daughter of Prince Leopold, youngest son of Queen Victoria. After passing out at Sandhurst, he was commissioned to a Hussar regiment, the Royal Horse Guards, and the 2nd Life Guards, and served with distinction in Matabeleland in 1896 and in the S. African war, 1898–1900. Appointed Governor-General of the Union of S. Africa from 1925 till 1931. Governor-General of Canada, 1940–6.

Athlone, Godart Ginkell, Earl of, Dutch general (1630–1703), accompanied Prince of Orange to England, 1688; fought in battle of Boyne, 1690, and was made Commander-in-Chief in Ireland, 1691, when he took A. and defeated the Irish. Received his title, 1692. Commanded Dutch in Flanders, 1695–6, and Dutch troops under Marlborough, 1702.

Athlone, tn of co. Westmeath, Rep. of Ireland, on the R. Shannon, an important road, rail, and canal junction, the 'cap. of the midlands.' Since Brian Boru's hosting there in 1001, A. has been the scene of constant struggles for possession. The castle, founded in John's reign, was besieged by William III in 1688, and finally taken by Gen. Ginkel in 1691. The modern Shannon bridge, replacing the old bridge which was the scene of Sergeant Custume's heroic defence, is fine bow-string and lattice iron work; the 3 prin. churches are St Mary's, St Anthony's (Franciscan), and SS. Peter and Paul's, and the schools of the Sisters of Mercy and the Marist Brothers are supplemented by a modern technical college. A. to-day is a progressive modern tn, prin. industries being cotton and woollen goods, and there are military barracks. Pop. 9015.

Atholl, Forest of, dist. in the N. of Perthshire, Scotland, on the S. slopes of the Grampians. Its chief tns are Blair Atholl, Pitlochry, and Dunkeld; its lakes, Loch Rannoch and Loch Tummel, are famous for their beauty.

Atholstan, Sir Hugh Graham, 1st Baron, of Atholstan, Quebec (1848–1938), Canadian newspaper owner, founder and

president of the *Montreal Evening Star*. He was knighted in 1908 for his public services, and was most zealous in connection with the dispatch of the Canadian contingent in the Boer War. Canadian delegate to the Imperial Conference in 1909. Raised to the peerage as a baron of the U.K. in 1917, and took his seat in the House of Lords, 1920.

Athos, mt. of Greece, at the extremity of the most E. of the 3 tongues of the Chalcidice Peninsula, on the Aegean Sea. It is 6670 ft high. The name is also applied to the whole tongue of land, which is connected with the mainland by an isthmus just over a m. broad. The peninsula is about 30 m. long and 3-6 m. wide. There are still traces of a canal cut through the isthmus by Xerxes to avoid the dangerous promontory. Since the Middle Ages Mt A. has been the seat of an autonomous monastic community, and a centre of theological learning; the remains of magnificent libraries exist. There are now 20 Orthodox monasteries and numerous chapels and hermitages on the peninsula, with a pop. of about 4000 monks. See R. M. Dawkins, *The Monks of Athos*, 1936.

Athy, tn of co. Kildare, Rep. of Ireland, at the junction of the R. Barrow and the Grand Canal, 40 m. SW. of Dublin. It was the site of a great Irish tribal battle in the 3rd cent. The tn grew up round the monasteries of the Crutched and Dominican friars; it was plundered by the Scots after the battle of Ardsall (1315). There are manufs. of bricks and tiles, asbestos cement, and hardboard. Pop. 3800.

Athyrium, genus of ferns, family Polypodiaceae, about 200 species, including *A. filix-femina*, the cosmopolitan Lady Fern.

Atikokan, tn of Ontario, Canada, 90 m. W. of Port Arthur, with large iron ore development. Pop. 4577.

Atitlan: 1. Lake of Solotl dept, Guatemala, Central America. It is c. 4500 ft above sea level, 16 m. long and 11½ m. wide, with a circumference of 64 m., surrounded by mts, very deep, and with no visible outlet. It has been called 'more beautiful than Lake Como.' There is a tn A., or Santiago A., on the S. shore of the lake (pop. 7200), and other villages of tourist interest.

2. Nearby volcano of same name; 11,500 ft.

Atlu, one of the S. Cook Is.

Atfeh, see ACHIN.

Atkins, Tommy, see TOMMY ATKINS.

Atkinson, Sir Harry (1831-92), politician, b. Cheshire. He went to New Zealand in 1855 and soon distinguished himself. He became captain in the Waitara war, 1860-4, and minister of defence in the Cabinet of Sir Frederick Aloysius Weld, 1864-5. He was 3 times prime minister of New Zealand, and 4 times colonial treasurer, thanks to his insatiable capacity for work and great power of concentration which more than balanced his lack of the arts that win easy popularity.

Atkinson, John (1835-97), Amer. Methodist Episcopal preacher, b. Deerfield, New York. He wrote the well-known

hymn 'We Shall Meet Beyond the River,' and historical works on Methodism.

Atkyns, Richard (1615-77), typographical writer. Famous for *The Origin and Growth of Printing*, 1664, in which he tried to estab. that printing was a Crown monopoly, and endeavoured to secure the office of patentee for himself.

Atlanta, cap. city of Georgia, U.S.A., and co. seat of Fulton co., in the NW. part of the state. It is the seat of Clark College, Morehouse College, part of Emory Univ., Georgia Institute of Technology, Oglethorpe Univ., the Morris Brown College, Gammon Theological Seminary, the John Marshall Law School, the S. College of Pharmacy, A. Law School, the Woodrow Wilson College of Law, and A. div. of the Univ. of Georgia. While it has developed considerably as an important manufacturing city, it is even more important as the distributing centre for the S. Many of the great industries of the N. have depots here, and it is also a kind of insurance cap for the S. As a consequence it is a city of skyscraper office buildings. It manufs. mattresses, clothing, textiles, furniture, pencils, paint, cotton-seed oil, asphalt and foundry products, machinery, electrical goods, paper, and shoes; printing and publishing, meat packing, and car assembling are also important. It is a port of entry. Settled in 1840, it was besieged and captured by the Union troops under Gen. Sherman in the Amer. Civil War, and the business section was destroyed. Its growth at the end of the 19th cent. was rapid. With the near-lying tns, which are really its suburbs, greater A. had a total pop. of 331,314 in 1950.

Atlantes, in architecture, male figures used as columns to support cornices, architraves, etc.

Atlantic, **Battle of**, the name given to the Ger. U-boats' assault, in the Second World War, on Brit.—and later, allied—sea power and its defeat. It was a long-drawn-out battle, fought with skill and determination on both sides, and it is described in a comprehensive account issued in 1946 by the Admiralty and the Air Ministry entitled *The Battle of the Atlantic*. This account distinguishes 8 separate phases of the struggle, taking in the Indian as well as the A. Ocean. In the first phase, from the beginning of the war to June 1940, sinkings of Brit. ships were not very numerous. The sinkings were scattered off the W. approaches to the Eng. Channel and Bay of Biscay, with a few in the N. Sea, while but few U-boats were sunk. In the second phase, June 1940-Mar. 1941, things became rapidly worse; for U-boats were swiftly increasing in numbers, and Britain was very short of escort craft, while the Germans were using long-range aircraft in collaboration with submarines. The area of destruction shifted to the N.-westward of the Brit. Isles. Air escort, however, was being developed by Britain and in the third phase, up to the end of 1941, Ger. submarine losses were very great. The fourth phase (Jan.-July 1942) saw America's entry into the war, with consequently

high losses among the dense sea traffic of the Caribbean and U.S. seaboard, where full defence was yet to be organised. The whole area of Ger. submarine activity now shifted to the W. half of the A., leaving the E. half almost free. But there were sinkings in the Arctic, on the convoy route to Russia, in the S. A., and in the Indian Ocean. In the fifth phase, Aug. 1942–May 1943, the Amer. E. coast had been cleared, though there were still substantial losses in the Caribbean, the chief source of allied fuel supplies. With the allied landing in N. Africa Ger. U-boats came into the Mediterranean, where an increasing number of them were destroyed; while the development of air collaboration in convoy defence had driven U-boat A. activity out into the gap that could not be covered by air patrols from Britain, Iceland, or Newfoundland. The introduction of escort carriers, however, had an immediate effect which is obvious in the sixth phase, June–Aug. 1943: for there were now hardly any sinkings of ships in the N. A., while the approaches to the Bay of Biscay were studded with the destruction of U-boats, aircraft of Coastal Command (q.v.) taking heavy toll of the enemy as they tried to pass through to the operational bases in France. In this phase for the first time in the battle more Ger. submarines were sunk than merchant ships; the tide of battle had turned. In the seventh phase, in which Italy had surrendered, and the Mediterranean route was reopened, the N. A. was thickly studded with U-boat sinkings, while merchant vessels were sunk only in the outer oceans. But the enemy was now pinning his faith on the new devices already in preparation. The eighth and last phase began with the allied invasion of Normandy. The Germans placed great reliance on the ability of their submarines to impede the Channel crossing, but they were forestalled by the massive air offensive against them, by which the Channel approaches, through which their submarines had to pass from their bases on the Fr. A. coast to reach the place of the allied landing, were so closely patrolled by Coastal Command aircraft and escort groups co-operating with them that not a U-boat got through. See also NAVAL OPERATIONS IN SECOND WORLD WAR.

Atlantic Cable. Although a transatlantic cable was projected about 1843, the first A. C. was not laid until 1857. This broke, and further attempts in 1858 and 1865 were also unsuccessful. The first successful A. C. was laid in 1866. The first telephone cable was laid in 1956. See CABLE.

Atlantic Charter (or **Eight Points**), popular name given to a joint declaration of peace aims by Winston Churchill, Brit. Prime Minister, and President Roosevelt in Aug. 1941. The declaration opened with the general statement that the signatories 'deem it right to make known certain common principles in the national policies of our respective countries on which we base our hopes for a better future for the world' and then proceeded

to specify the principles as follows: *First*, their countries sought no aggrandisement, territorial or other; *second*, they desired to see no territorial changes that did not accord with the freely expressed wishes of the peoples concerned; *third*, they respected the right of all peoples to choose the form of gov. under which they would live; and they wished to see sovereign rights and self-gov. restored to those who had been forcibly deprived of them; *fourth*, they would endeavour, with due respect for their existing obligations, to further enjoyment by all states, great or small, victor or vanquished, of access, on equal terms, to the trade and to the raw materials of the world which were needed for their economic prosperity; *fifth*, they



Imperial War Museum;
Crown Copyright

ATLANTIC CHARTER
President Roosevelt and
Winston Churchill.

desired to bring about the fullest collaboration between all nations in the economic field, with the object of securing for all improved labour standards, economic advancement, and social security; *sixth*, after the final destruction of Nazi tyranny, they hoped to see estab. a peace which would afford to all nations the means of dwelling in safety within their own boundaries, and which would afford assurance that all the men in all the lands might live out their lives in freedom from fear and want; *seventh*, such a peace should enable all men to traverse the high seas and oceans without hindrance; *eighth*, they believed all of the nations of the world, for realistic as well as spiritual reasons, must come to the abandonment of the use of force. Since no future peace could be maintained if land, sea, or air armaments continued to be employed by nations which threatened, or might threaten, aggression outside of their frontiers, they believed, pending the estab. of a wider and permanent system of general security, that the disarmament of such nations was essential.

The significance of this declaration lay in the fact that belligerent Britain and

non-belligerent America found themselves identically minded about the principles that must determine the peace and the shape and structure of the world which that peace would largely re-create. It is interesting that the A. C. contains many of the principles set out in President Wilson's Fourteen Points (q.v.) of Jan. 1918.

Atlantic City, co. seat of A. co., New Jersey, U.S.A. One of the most celebrated seaside resorts in the U.S.A., it is situated on a 10-m. sandbar 60 m. SE. of Philadelphia. Its close proximity to this city and to New York and its splendid railroad connections with the rest of the U.S.A. assure it an enormous all-the-year-round patronage. It has one of the finest bathing beaches in the world. Its boardwalk is 7 m. long. This walk, which is a very extensive promenade, is fenced on one side by the sea and on the other by many magnificent seaside hotels, some of which are of skyscraper size. A. C. has a naval air station and manufs. confectionery, paint, glassware, hosiery, furniture, and boats; it has dairy, poultry, and fruit products, and ships seafood. Pop. 61,650.

Atlantic Flights. The N. Atlantic was first flown in 1919, both by aeroplane and by airship. A gallant but unsuccessful attempt was first made in a Sopwith-Rolls-Royce plane. Harry C. Hawker, pilot, and Cdr Mackenzie Grieve, R.N., navigator, started from St John's, Newfoundland, on the evening of 18 May 1919, the proposed route being to a point on the Galway coast, a distance of 1880 m. No news reached England of the progress of this flight for a week, and it was assumed that it had ended fatally. But on 25 May a Dan. steamer, *Mary*, which had no radio, reported that she had picked up the crew of the machine, who had been in the water for about 90 min. before rescue. The plane was 1100 m. from Newfoundland and 750 from Ireland, the engine having failed through mechanical defect. Simultaneously with this attempt, 3 Amer. seaplanes, *N.C. 3*, *N.C. 4*, and *N.C. 1*, started from Trepassey Bay, Newfoundland, on 15 May at 11 p.m., the proposed route being via the Azores to Lisbon and thence to England, a distance of 3368 m. The only machine to complete the distance was *N.C. 4*, piloted by Lt.-Cdr Read, U.S. Navy, who reached the Azores at 2.25 p.m., 16 May, but remained some time there, only reaching Plymouth on 31 May. The third attempt, which proved entirely successful, was begun 14 June at 4.28 p.m. by Capt. John Alcock, pilot, and Lt. Whitten Brown, navigator, in a Vickers-Vimy machine, and the journey from St John's to Clifden, Galway, about 1880 m., was accomplished in 16 hrs 12 min., the plane landing in a bog at 8.40 a.m., 15 June. The mean speed was somewhat over 120 m.p.h. This was the first direct Atlantic crossing by an aeroplane. In the same year the Brit. airship *R. 34* made a double crossing of the Atlantic from E. Fortune (Scotland) to New York, and back to Pulham (Norfolk).

Other competitors were forthcoming for the prize of £10,000 offered by the *Daily Mail* for a transatlantic flight, but mishaps or bad weather prevented them from starting. The flight of the Amer. seaplanes which was organised by the U.S. Navy administration did not come within the conditions of the newspaper prize competition: the prize eventually went to Capt. (later Sir J.) Alcock; but it was organised with precision and was most useful as pioneer work. No other attempts were made to cross until the year 1927, when, on 20 May, Capt. (later Col.) Charles Lindbergh, an Amer. air-mail pilot, left Long Is. alone at 12.31 p.m. in his monoplane *Spirit of St Louis*, and landed at Le Bourget aerodrome near Paris at 10.22 p.m., 21 May, having crossed in a little over 33 hrs, covering about 3000 m. Just prior to this success Capt. Nungesser, the Fr. aviator, with a fellow countryman, Capt. Coll, attempted the flight from E. to W. in a Levasseur biplane, but no trace was afterwards found of them. In June 1927 2 other Americans, Mr Chamberlain, an airman, and Mr Levine, left New York in a Wright monoplane of 200 h.p. and crossing the ocean alighted at Elsieben, Germany, a distance of about 3900 m. in just over 42 hrs. These successes acted as a spur to many subsequent aspirants, but it is evident that insufficient regard was paid to the vagaries of wind and weather, for many perished. In the late summer of 1927 Col. B. Minchin, Capt. L. Hamilton, and Princess Löwenstein-Wertheim tried to cross from E. to W., but were lost. Cdr (now Rear-Adm.) Byrd (q.v.), with 4 passengers, flew from New York to Ver-sur-Mer, France, 29 June-1 July 1927, a distance of 3744 m., in 46 hrs 6 min., coming down safely near the coast after flying many hrs over France in a fog. The earliest successful E. to W. flights were those of W./Cdr Kingsford Smith, who, with companions, crossed from Portmarnock, Dublin, to Newfoundland in June 1930, and of Capt. Coste and M. Bellonte, who in Sept. of the same year flew from Le Bourget to New York. Thereafter a considerable number of men and women flew the Atlantic, both in large and even in light aircraft.

The first transatlantic flight with a full complement of passengers was made by the Boeing flying-boat of Pan-Am. Airways, the *Yankee Clipper*, which left Baltimore Harbour on 26 Mar. 1939 on a survey flight, and arrived at Horta, Azores, on 27 Mar., covering the distance of 2448 m. in 17 hrs 32 min. The flying-boat carried a crew of 11 and 10 passengers.

Negotiations for the long-projected air-mail service across the Atlantic between the U.K., U.S.A., and Canadian Govs. were completed in 1935. Trial flights were made by the U.K. flying-boat *Caledonia* in 1937 and by the *Cambria* later in the same year. This Imperial Airways boat averaged 190 m.p.h. for the whole journey, her flying time from Botwood, Newfoundland, to Foynes, Ireland, being 10 hrs 33 min. Further

experimental flights were made in 1939
See AERONAUTICS and AIR MAIL.

Atlantic Monthly, an Amer. review, founded at Boston in 1857. Its contents were somewhat similar to, though rather more purely literary than, those of its famous and older rival the *North American Review*. James Russell Lowell was its first editor, and the magazine was directed by Wm Dean Howells, 1865-81, while among the most famous 19th-cent. contributors were Longfellow, Oliver Wendell Holmes, and Whittier.

Atlantic Ocean, one of the 5 great hydrographical divs. of the world, named after either Mt Atlas or the mythical Atlantis, and, lying as it does between Europe and Africa on the E. and N. and S. America on the W., dividing the Old and New Worlds. It stretches from about 70° N. to 40° S., from the Arctic to the Antarctic Ocean, and is usually taken as being divided by the Equator into the N. Atlantic, with an area of about 14,000,000 sq. m., and the S. Atlantic, with an area of about 10,100,000 sq. m. The breadth varies from 4500 m. between the Saharan coast and Florida to 16,000 m. between the Guinea coast and Brazil. It communicates with the Baltic and Mediterranean Seas, and among the smaller seas and gulfs forming part of it are the N. Sea, the Irish Sea, the Caribbean Sea, the Bay of Biscay, the Gulf of Guinea, the Gulf of Mexico, and the Gulf of St Lawrence. Continental is. are numerous, including the Brit. Isles, the W. Indies, Newfoundland, and the Falklands; among the comparatively few oceanic is. are Iceland, the Azores, St Paul's Rocks, Ascension, Tristan da Cunha, Jan Mayen, the Bermudas, the Canaries, the Cape Verdes, Madeira, Fernando Noronha, Trinidad, and St Helena. The A. O. receives the drainage of almost all W. Europe, most of Africa, N. America E. of the Rockies, and S. America E. of the Andes, the chief riv. systems flowing into it being those of the Rhine, Loire, Tagus, Senegal, Niger, Congo, St Lawrence, Mississippi, Orinoco, Amazon, and La Plata.

The average depth of the A. O. is 1800 fathoms; the greatest depth is approximately 4600 fathoms. A low submarine ridge runs approximately down the centre from N. to S. There is a considerable E. to W. extension of this ridge between Ireland and Newfoundland, along which the chief cables have been laid, and on both sides of the main elevation are to be found the greatest depths, often between 3000 and 4000 fathoms, while the Nares Deep, N. of the Virgin Is., reaches 4561 fathoms. There are sev. large sandbanks rising to within a few fathoms of the surface, the chief of these being the Newfoundland, the Dogger, and the Agulhas Banks. The continental shelf all round the A. O. is narrow and falls away in a steep slope. The surface temp. varies from about 85° F. at the Equator to 40° F. in the N. and S. temperate regions, and the bottom water temp. averages about 35° F. The water is most salt (density over 1.0275) in

the trade-wind regions, and least in the belt of equatorial calms, always increasing in salinity below the surface.

The trade winds, which determine the course of the ocean currents, have their origin in high-pressure areas in the middle of both N. and S. Atlantics. The SE. and NE. trades produce the warm equatorial current, which divides at Cape St Roque and flows S. as the Brazil current and N. through the Caribbean Sea and Gulf of Mexico, emerging as the Gulf Stream, which has an enormous influence on the climate of NW. Europe. A cold current flows S. from the Arctic Ocean and, as the Labrador current, passes beneath the Gulf Stream off the Newfoundland Banks. The N. Atlantic current leaves a patch of central calm, between 40° and 75° W. and 20° and 35° N., which is occupied by the Sargasso Sea, in which are enormous floating banks of gulf-weed. The surface waters teem with animal and vegetable life, which decreases in mid ocean and at great depths. It is rich in edible fish, and herring and cod fishing form important industries on both the Amer. and European shores of the N. Atlantic.

The Atlantic is the great commercial highway of the world, its shores being inhabited by the most civilised nations in existence. The chief danger to navigation is the presence of floating ice, which is carried N. from the Antarctic to 38° S., and S. from the Arctic to 40° N., thus interfering with the great steamship route between England and N. America. This crossing can now be made in under 4 days, indicating the enormous progress in navigation since 1620, when the *Mayflower* took 106 days for the journey. There are now numerous transatlantic submarine cables and others along the shores connecting important ports. See *Reports on the Scientific Results of the Voyage of H.M.S. 'Challenger'*, ed. by Sir Wyville Thomson and Dr John Murray (37 vols.), 1880-9, and *Results of a Deep-Sea Sounding Expedition in the North Atlantic during the Summer of 1899*; Royal Geographical Society, *Supplementary Papers*, 1910; J. Murray and J. Hjort, *The Depths of the Ocean*, 1912; C. C. Howell, *Ocean Research and the Great Fisheries*, 1921; F. C. Bowen, *Century of Atlantic Travel, 1830-1930*, 1932; G. Schott, *Geographie des Atlantischen Ozeans*, 1942.

Atlantic Pact, see NORTH ATLANTIC TREATY and EUROPE. History.

Atlantic Passage Records. The first recorded crossing by a sailing vessel was that by Christopher Columbus who, in 1492, reached Guanahani in 70 days. The first crossing by a steamboat was made by the *Sirius* in 1838 in 19 days. The *Great Western* was the first steamboat built for a regular transatlantic service, and indeed only failed by a few hours to forestall the *Sirius*. The fastest crossings to date are those of the Amer. S.S. *United States* in 1952 (3 days 12 hrs 12 min. and 3 days 10 hrs 40 min.). Other fast crossings were *Mauretania*, 4 days 10 hrs 41 min. in 1909; *Europa*, 4 days 17 hrs 6 min. in 1930; *Bremen*, 4 days 15 hrs 56 min. in 1932; *Bremen*,

4 days 17 hrs 43 min. in 1933; *Empress of Britain*, 4 days 6 hrs 58 min. in 1934; *Normandie*, 4 days 3 hrs 2 min. in 1935; *Queen Mary*, 3 days 23 hrs 57 min. in 1936; *Normandie*, 3 days 23 hrs 2 min. in 1937; *Queen Mary*, 3 days 21 hrs 45 min. and 3 days 20 hrs 42 min. in 1938. The record crossings by the *Queen Mary* in 1938 and that of the *Normandie* in 1937 were all made from Bishop Rock to Ambrose Light—a distance of 2907 m. The *Queen Mary*'s second 1936 voyage was 2938 m. The *United States* record crossings in 1952 were from Ambrose Light to Bishop Rock, 2949 m., completed 7 July, and from Bishop Rock to Ambrose Light, 2906 m., completed 14 July. See also SHIPS and SHIPBUILDING, *The Blue Riband of the Atlantic*.

Atlantic Shipping Trust, or 'Morgan Combine,' popular expression for the International Mercantile Marine Co., organised in 1902 by Mr J. Pierpont Morgan to control the chief Brit. and Amer. N. Atlantic steamship companies. In 1902 provisional agreements were entered into for the acquisition before the end of the year of the White Star Line, the Dominion Line, and the Leyland Line (British), and the Amer. Line and Atlantic Transport Line (American), by a corporation of which the total capital stock amounted to £120,000,000. By this agreement Brit. ships were to sail with Brit. registers and have Brit. officers and crews. The combination was incorporated at Trenton, New Jersey. The Brit. Gov. also entered into agreements with Mr Morgan by which it was secured that Brit. companies in the combination should remain British. The agreements were to hold good for 20 years, and were finally ratified in 1903. In 1927, during the great post-war slump in shipping, the International Mercantile Marine Co. decided to dispose of part of their holdings. The White Star Line and the Shaw, Savill & Albion Co., together with the Aberdeen Line, were sold to the great Brit. combine headed by Lord Kylsant.

Atlantic Star, Brit. decoration to commemorate the battle of the Atlantic, designed primarily for convoys and their escorts and anti-submarine forces, as well as for fast merchant ships that sailed alone. The ribbon is blue, white, and sea-green, shaded and watered. The star is granted for 6 months' service afloat in the Navy in the Atlantic and home waters after 3 Sept. 1939, and before 8 May 1945. The Merchant Navy is awarded the star under the same conditions as the Navy, except that 6 months' service anywhere at sea qualifies, provided that one or more voyages were made in the defined area. Air crews of the R.A.F. are also eligible for the award.

Atlantic Transport Company Limited, founded in 1889, now a subsidiary of United States Lines (q.v.) The company acts as steamship operators and agents; originating from the combination of the National Steamship Co., the Wilson Line, and the Furness-Leyland Line, the company formerly owned and operated Brit. flag passenger and cargo vessels.

Atlantis, anct mythical is., supposed to lie in the Atlantic, W. of the Straits of Gibraltar, described by Plato in the *Timaeus* and the *Cratylus*, where it is stated that Solon was told of its existence by an Egyptian priest, and that it had been submerged 9000 years previously in punishment for its impety in waging war against Athens. A shoal of mud still marked its site. It has been identified with the Canaries, America, and Scandinavia, but is probably only a Gk form of the fabled Celtic Is. of the Dead, always placed in the W. Ocean.

Atlas, son of Iapetus and Clymene, one of the mythical Titans, whom he led against the gods, and was therefore condemned to stand near the Hesperides and bear the heavens on his shoulders. In another legend, he was turned into Mt. A. by Perseus with the Gorgon's head. The name is given to the highest vertebra of the spine, and to a collection of maps, having been first used in this latter sense by Mercator in the 16th cent.

Atlas Mountains, great mt system of NW. Africa, stretching N.E. from Cape Nun in Morocco to Cape Bon in Tunis. For the most part there is no continuous chain, but an irregular mass of mountainous land, including vast plateaus and highlands. They may be roughly divided into (1) the Moroccan Atlas, and (2) the Tunisian and Algerian Atlas, both containing numerous minor divs. In (1) there are 4 main chains: (a) the Great Atlas, containing the peaks of Tizi Likumpt (13,151 ft), Tizi Tamjurt (14,500 ft), and Miltain (11,430 ft); (b) the Middle Atlas, to the N. of (a); (c) the Anti-Atlas, connecting with (a) near the peak of Sebel Ayashin (12,000–14,000 ft); (d) the Jebel Bane, to the S. of (c). In (2) there are 2 main ranges: (a) the Great Atlas, containing the peak of Sheliya (7760 ft), and (b) the Little Atlas, containing the peak of Leila Khedija, the two being separated by a plateau. The A. M. are non-volcanic, and only very few summits are perpetually covered with snow. The valleys are very fertile, and the lower slopes covered with forest. The dist. is difficult of penetration, except in Algeria, where there are some excellent military roads. The geological formation of the mts is crystalline rocks and schist, with flanking of limestone. The mineral wealth is as yet practically unworked.

Atlixco, city of Mexico, 8 m. SW. of Puebla, situated at an altitude of 6000 ft in a dist. noted for grain and fruit. A. is a rail junction, and has an airfield. Pop. 17,000.

Atmolysis, method of separating gases of different densities by passing them through a porous tube or diaphragm. Let a tobacco-pipe stem be cemented into an outer glass tube so that its ends project, and let the outer tube be exhausted by an air-pump. If a slow current of air be passed through the pipe, the nitrogen diffuses through the porous clay quicker than the heavier oxygen, so that the air emerging is richer in oxygen than ordinary air. By repeating the process with the

same gas a number of times, a fairly pure supply of oxygen is obtained.

Atmometer, instrument used to determine the amount of water passing into the air by evaporation. It consists of a hollow ball of unglazed clay fitted with a narrow glass tube. The instrument is filled with water and inverted with the glass tube dipping into a mercury bath. As the water percolates through the porous clay and is evaporated into the atmosphere, the mercury rises in the glass tube, and the level of the mercury gives a rough indication of the humidity of the atmosphere.

Atmosphere, gaseous covering or envelope of the earth or any other planet, extended to mean the somewhat indefinable influence surrounding a person or thing. The earth's A. is the remainder of the collection of gaseous matter, part of which has cooled down to form the earth and sea. The gaseous constituents still unliquefied are a mixture of gases comprising about 21 per cent of oxygen, 78 per cent of nitrogen, 1 per cent of argon and other gases, and a slight trace of carbon dioxide. If the air is moist, it contains aqueous vapour to a limit of about 3 per cent. Other ingredients are found in particular localities: gaseous compounds of sulphur and nitrogen in fens, salt at the seaside; and everywhere dust composed of inorganic particles, decaying organic matter, tiny seeds and pollen from plants, and countless bacteria of all sorts.

The oxygen of the A. is breathed into the lungs of animals and enters the gills of fishes after absorption by the water, and it is constantly entering into combination with other substances by combustion or the slower processes of oxidation, as in rusting iron. The animals breathe out carbon dioxide, and combustion of carbon compounds sets free a great amount of the same gas, so that if there were no opposing influences at work the air would quickly become too much vitiated to sustain life. All plants with green colouring matter, however, are able to absorb carbon dioxide, utilising the carbon to build up their tissues, and setting free most of the oxygen to preserve the balance in the A. Carbon dioxide is also more soluble in water than oxygen, so that any greater pressure of the former gas causes increased absorption by all water surfaces, thus tending to keep the proportions constant. Nitrogen serves as a diluent for oxygen in breathing, and is converted by lightning flashes, and to some extent by certain bacteria in the roots of leguminous plants and in the soil, into compounds necessary for most forms of plant life. Argon (q.v.) is a remarkably inert gas, discovered in 1894, and is accompanied in the air by smaller quantities of similar gases, viz. helium, neon, krypton, and xenon.

The A. has no definite upper boundary and extends, in a very rarefied state, to several hundred m. above the earth's surface. Because of its weight it exerts a pressure of about 14.7 lb. on every sq. in.

of surface. Our bodies have an internal pressure which in ordinary circumstances exactly balances atmospheric pressure, and is therefore not felt by us. The heating of land and sea by the sun ultimately causes variations in pressure and, in time, weather (see METEOROLOGY).

Atmosphere, Standard, a hypothetical A. in which the relation between pressure, temp., air density, and height is given by a mathematical formula. Such specified A.s are required for aircraft design and in ballistics. In the International S. A. used for graduating aneroid altimeters the sea-level values of pressure and temp. are 760 mm. (1013.2 mb.) and 15° C. respectively, and the fall of temp. with height is 6.5° C. per km. up to 11 km., and thereafter constant at -5.65° C., but other values are used for other purposes. When the sea-level values of pressure and temp., and the rate of fall of temp. with height, are known, the pressure and density at any height can be calculated from the so-called hydrostatic equation of physics. In the real A. the variation of temp. with height is too irregular and variable to be represented by a simple formula.

Atmospheric Railway, see RAILWAYS.

Atmospherics, or Static, clicks or crackling noises in the output of a radio receiver, usually due to thunderstorms or other disturbances in the electric field of the atmosphere. The energy distribution covers the whole range of frequencies used in radio communication. The pulses are propagated as ordinary signals and conditions that favour the normal transmission also favour the occurrence of A. Similar noises are produced by interference from power lines, ignition in internal-combustion engines, and other electrical apparatus.

Atoll, type of coral is. consisting of low circular coral reefs, which form a ring of land around a central lagoon. Their origin was for long an enigma, as they rise abruptly from ocean floors of a depth far exceeding that at which the coral polyp can live. They are found in the tropical Indian and Pacific Oceans. It was formerly thought that the A.s were so shaped because they had grown upon the ruins of submerged volcanic craters. Darwin's explanation is now generally accepted. A.s, according to him, are due to the upgrowth of coral reefs over is. that have gradually subsided at a rate no greater than the upward building of the coral. Thus the A. began as a fringing reef, and then became a barrier reef as the land slowly subsided. See CORAL ISLANDS.

Atom and Atomic Theory. *Atom* (Gk *atomos*, undivided) is the name given to the smallest particle into which a chemical element can be divided. Among the ancients there were 2 theories as to the nature of matter, or substance. Some, such as Anaxagoras and Aristotle (4th cent. bc), held that matter was infinite and continuous, and that therefore any substance could theoretically be divided and subdivided to an infinite extent. Others, such as Democritus and Epicurus (5th

cent. BC), taught that matter was *grained*, that is, consisted of minute particles which could not be divided. Both theories were based on naturally slender experimental evidence. The question has its interest in the domains of chem. and physics, and different conceptions of the nature of the smallest particles of matter have arisen to explain chemical and physical phenomena.

Atomic theory. Towards the end of the 18th cent. the development of experimental chem. led to a desire for greater quantitative exactness. The theory of 'phlogiston' had been held to explain many chemical changes. In combustion, for example, the burning body gave forth 'phlogiston,' which was regarded as an element and therefore as transferable from one body to another. The effect of weighing the products of combustion was, however, to show that weight was gained and not lost. About this time Priestley discovered oxygen, and a new light was thrown on the phenomena of combustion. The idea gradually prevailed that the combined weight of the substances concerned in chemical change was not altered at any stage of the process; that is, if all the substances are weighed before the action, and all the products collected and weighed, the 2 results will be found to be equal. This was known to be true with regard to simple actions where there is no change from gas to liquid or solid, or vice versa, and other experimental evidence caused the principle of the 'Conservation of Matter' to be extended to all cases. The value of this principle has been enormous, particularly in the direction of detecting new elements.

John Dalton, in the tradition of Galileo, Descartes, Bacon, Boyle, and Newton, believed that gases consisted of particles, or 'corpuscles.' He appears to have reasoned that, as all the particles of the same substances are alike, any chemical action between 2 substances means a similar change in the individual particles of the substances concerned. The particles, therefore, must be chemically divisible, the particles of a compound into 'A.s' of the elements combined. Dalton enunciated the law of *constant proportions*, which states that when 2 elements unite to form a compound the weights that combine are in an invariable ratio, a ratio that is characteristic of that compound. When, for instance, oxygen and hydrogen combine to form water, as all oxygen A.s are of the same weight, and the weight of hydrogen A.s likewise constant, and as each molecule of the resulting water contains the same proportion of hydrogen and oxygen A.s, it follows that the weights of the quantities concerned will be proportional to the weights of the A.s. Dalton considered that a molecule of water consisted of 1 A. of hydrogen and 1 of oxygen. As it was necessary to have 8 times as much oxygen by weight as hydrogen to produce water, it was calculated that the weight of an A. of oxygen was 8 times that of an A. of hydrogen. Other

reactions, however, modified this view. For example, marsh gas consists of carbon and hydrogen. From the constitution of carbon monoxide (CO) it was found that a weight of 6 units of carbon combined with 8 units of oxygen. On the assumption that the atomic weight of oxygen was 8, hydrogen as the lightest gas being 1, the atomic weight of carbon must be 6. In forming marsh gas 6 units of carbon combine with 2 units of hydrogen. This gives CH_2 as the formula for marsh gas. It was found, however, that a quarter of the hydrogen could be replaced by half an equivalent of chlorine, giving $\text{CH}_{1\frac{1}{2}}\text{Cl}_{\frac{1}{2}}$, which is absurd. This must therefore be read as $\text{C}_2\text{H}_3\text{Cl}$, which means that the formula for marsh gas must be revised to read C_2H_4 . But if the atomic weight of carbon is 6 it always appears in organic reactions in even numbers; therefore the probability is that the atomic weight is 12. This necessitates again revising the marsh gas formula, which now reads CH_4 . Therefore from the formula CO the atomic weight of oxygen is 16. Besides, if oxygen were 8, other formulae would appear with O as an even number. Therefore formula for water = H_2O .

The above is an example of the reasoning by which the relative proportions of the A.s in molecules were arrived at, and each result helped to confirm or revise previous determinations. It was known that the same elements combined in different proportions to form different substances; carbon, for instance, forms 2 oxides, CO and CO_2 . The relations between such substances are expressed by the law of *multiple proportions*, which asserts that if 2 elements form more than 1 compound, then the weights of the 1 element which are found combined with unit weight of the other in the different compounds must be in the ratio of 2 or more whole numbers.

Shortly after Dalton's atomic theory had been enunciated, Gay-Lussac investigated the volumetric conditions of gases in combination, with the result that he discovered and pub. the law that when gases combine together they do so in vols. which bear a simple ratio to one another and to that of their product (if gaseous). In 1811 Avogadro pub. his hypothesis on the molecular constitution of gases, which asserts that under the same conditions of temp. and pressure equal vols. of all gases contain the same number of molecules whether those molecules consist of single A.s or are composed of 2 or more A.s of the same or different kinds. Both hypotheses were well supported by experimental evidence, and form in combination an interesting corollary to Dalton's atomic theory. It was found that 2 vols. of hydrogen united with 1 vol. of oxygen at the same temp. and pressure to form 2 vols. of water vapour under the same conditions of temp. and pressure. From Avogadro's hypothesis it follows that there must be the same number of molecules of water vapour as there were of hydrogen. Therefore each

molecule of water contains just as many A.s of hydrogen as a molecule of hydrogen. As the formula for water is H_2O , it follows that a molecule of hydrogen contains 2 A.s. If the molecular weight of hydrogen be taken as 2, the molecular weight of any vapour can be obtained by comparing the weight of an equal vol. of hydrogen at the same conditions of temp. and pressure. If the molecular weight of all compounds of oxygen be found in this way, and if each compound be decomposed and the weight of oxygen determined with relation to the rest of the constituents, the weight of the A.s of oxygen in the molecules of its compounds can be calculated. These weights will bear a simple relation to each other, and the least is taken as the atomic weight, for it is assumed for this purpose that an element enters into at least one compound as a single A.

In this and other ways the atomic weights of all the elements have been determined and tabulated. At first it appeared as if they would all bear a simple relation to one another, but this proved to be illusory, and many of the early atomic weights which were relied upon on account of their simplicity have been superseded by more accurate determinations. The whole mechanism of formulae and equations is based on atomic weights, so that the progress of chem. may be said to be determined largely by the atomic theory. In considering organic compounds we find no such simple procedure as in inorganic substances; some of the molecules, such as that of sucrose, $C_{12}H_{22}O_{11}$, contain a surprising number of A.s, and the molecules are credited with a certain structure in which the various A.s have characteristic tendencies and affinities. On the whole, however, it may be said that the atomic theory provides a good foundation for the theory of organic chem., and a number of interesting syntheses have been made possible through its instrumentality.

Atomic structure and atomic energy. Until near the close of the 19th cent. it was possible to regard the A.s of the various known elements as completely stable particles, and although A.s of different elements have different properties and must therefore have diverse internal structures, little or nothing was known of these. It was found, however, that certain of the heavier A.s, such as those of uranium, thorium, and radium, emit continuously certain types of radiation which came to be known as alpha, beta, and gamma rays (q.v.). Rutherford and Soddy were able to show in 1902 that such radioactive A.s are unstable and break up spontaneously to form A.s of a different chemical and physical nature, and the alpha rays themselves are found to consist merely of charged helium A.s travelling at very high speeds. By studying the collision of alpha particles with other A.s Rutherford (1911) showed that practically the whole mass of any A. is concentrated in an extremely small central nucleus bearing a charge of

positive electricity, the magnitude of the charge being characteristic of the element to which the A. belongs. It was proposed by Bohr (1913) that around the nucleus, and at relatively great distances from it, revolve a group or groups of electrons in number sufficient to counter-balance the positive nuclear charge and render the A. as a whole neutral. These ideas of structure were further developed by Bohr, Sommerfeld, and others, using quantum theory, and proved extremely fruitful in explaining the properties of different A.s, and hence of matter in bulk. A more sophisticated treatment in terms of wave mechanics has been even more successful.

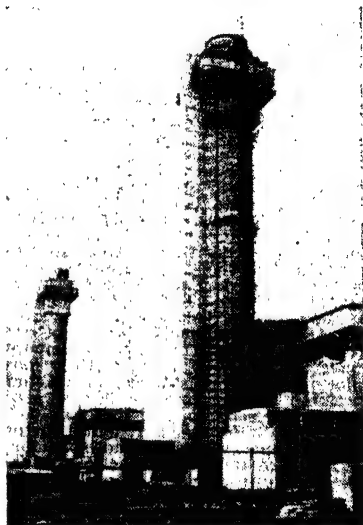
Since the electrons surrounding a nucleus shield the latter from the action of other A.s the chemical and physical properties of an element are determined, in the main, by the number and grouping of the electrons, and the similarity in this respect of A.s of the same element explains why they behave in the same way in chemical reactions. Many elements, however, are found to be made up of A.s which differ from one another in that, while they possess equal nuclear charges, they have nuclei of differing masses. Such differing A.s are called isotopes. In hydrogen, 2 isotopes are found whose masses are in the ratio of 2 to 1, and these differ somewhat in their physical and chemical properties. In general, however, the percentage differences of mass of the isotopes of an element are small and it is practically impossible to separate them by taking advantage of the very slight differences of their chemical behaviour. Very minute quantities of isotopes may be separated readily from a mixture of them by allowing the A.s to pass, while electrically charged, through suitably arranged electric and magnetic fields, and considerable progress has been made in increasing the amounts so obtainable. Another method of separation makes use of the fact that, in a gas, the speed at which A.s wander from point to point, i.e. rate of diffusion, depends upon their masses.

The alpha particles from radioactive A.s are emitted at very high speeds, and Rutherford showed that if they collide directly with the nuclei of other A.s which are normally stable ones, these can sometimes be transformed into A.s of a different element. During its passage through matter, however, an alpha particle loses speed through interactions with electron groups surrounding nuclei and by 'glancing' collisions with nuclei, and as the nuclei themselves are extremely minute the usual fate of an alpha particle is for its speed to be reduced in this way to a low value before a direct collision occurs. As a result, the transmutation of an A. to one of a different type by an alpha particle collision is a very rare event. Atomic transmutation on a larger scale was produced in 1932 by Cockcroft and Walton when they bombarded lithium A.s with high-speed hydrogen nuclei and obtained helium, but the amounts of the product were still extremely small.

The natural and artificial disintegrations of atomic nuclei are not only of interest from the point of view of transmutation, but also because of the enormous amounts of energy involved. The source of the high speed of alpha particles is found in the transformation of a small fraction of the mass of the A. that disintegrates. As a deduction from his theory of relativity Einstein showed in 1905 that there is no essential difference between mass and energy, and that the transformation of a very small mass would result in the production of large quantities of energy. Since the complete transformation of 1 oz. of matter releases an amount of energy comparable with that obtained by the combustion of 100,000 tons of coal, even the small mass transformation which accompanies certain nuclear transmutations can be of immense practical importance. Until recent years, however, the release of energy in considerable amounts had not been achieved, owing to the difficulty of bombarding nuclei by particles which could not, except in rare instances, penetrate within them. Alpha particles, as well as the nuclei used in such experiments as those of Cockcroft and Walton, are positively charged and so are repelled by the positive charges of other nuclei, with the consequence that only a very small fraction of the bombarding particles approach sufficiently closely to cause nuclear changes. A much more potent bombardment would obviously occur if the bombarding particles carried no charge. In 1932 such neutral particles, called neutrons (q.v.), were shown by Chadwick to result from the bombardment of beryllium by alpha particles, and streams of neutrons produced in this and other ways were soon shown to be very efficient agents for producing nuclear changes.

The methods of obtaining streams of neutrons involve the expenditure of considerable amounts of energy, and since many neutrons are necessarily slowed down and lost by absorption in atomic nuclei, the bombardment of most substances does not result in the production of a useful balance of energy. It is found, however, that if the rare isotope of uranium known as U235 is subjected to bombardment by neutrons of a suitable speed the uranium nuclei disintegrate into 2 fragments of approximately equal mass with the simultaneous production of further neutrons and release of large amounts of energy. Since the neutrons so produced are themselves capable of causing the disruption of other uranium nuclei, the process can, in a mass of U235 of suitable size, rapidly develop and release enormous amounts of energy, as in an atomic bomb (q.v.). The size is of importance since the neutrons produced in a small mass of U235 can escape from it without colliding with nuclei, and so without producing other neutrons. By the admixture with U235 of other A.s capable of retarding and capturing neutrons the rate of release of energy can be slowed down and controlled, to be used

for industrial purposes. The more abundant isotope of uranium, U238, if bombarded with neutrons of a suitable speed, is transformed into plutonium, an element which is not found in nature. This element, like U235, has potentialities as a source of atomic energy. Apart from the immense technical difficulties of using U235 as a source of industrial power, the separation of this isotope from U238 is both expensive and difficult. To overcome this, nuclear piles or reactors have been constructed from ordinary uranium metal, which is a mixture of U238 and U235 in the proportion of 140 to 1. The



U.K. Atomic Energy Authority

WINDSCALE PILE UNDER CONSTRUCTION

uranium metal is made into cylindrical slugs, spaced to form a lattice in a matrix of another material such as graphite. This latter acts as a moderator and is not mixed homogeneously with the uranium. The moderator slows down the fast neutrons emitted in the fission of U235 atoms. Some of these slow neutrons cause fission of other U235 atoms and some are captured by U238 atoms which ultimately form plutonium. This helps to maintain the reaction whilst the U235 is used up, as plutonium and U235 have similar fission properties. The reaction can be shut down after a time and the plutonium so formed can be chemically extracted from the slugs. The moderator may be dispensed with when enough U235 or plutonium has been obtained and a chain reaction with fast neutrons started. Either U235 or plutonium may be used in a bomb or used for enriching ordinary uranium metal in slow neutron

reactors. The latter must not be allowed to run unchecked as they would probably wreck themselves. Control of reactivity can be effected by insertion of cadmium rods in the neutron reactor. They absorb neutrons and are adjusted to control the intensity of the reaction. See also NUCLEAR POWER and PHYSICAL CONSTANTS. See H. D. Smyth, *Atomic Energy*, H.M.S.O., 1945; *Statements relating to the Atomic Bomb*, H.M.S.O., 1945; P. B. Moon, *Atomic Survey*, 1946; L. Kowarski, 'Atomic Piles,' *Discovery*, vol. vii, 1946; M. Davidson, *The Mid-Twentieth-Century Atom*, 1946; R. R. Nimmo, *Atomic Energy*, 1947; W. L. Laurence, *Dawn over Zero*, 1947; J. V. Dunworth, 'Operational Characteristics of the Harwell Piles,' *Research*, vol. ii, 1949; J. L. Crammer and R. E. Peferis (eds.), *Atomic Energy*, 1950; Otto Hahn, *New Atoms*, 1950; S. Glasstone, *Source-book on Atomic Energy*, 1956.

Atomic Bomb. Scientific research dating from the close of the 19th cent. showed that particular types of atoms are unstable and disintegrate spontaneously to form atoms of other types, with the simultaneous release of large quantities of energy. In the period 1934-1939 a new type of atomic disintegration was found to occur when certain atoms—in particular those of uranium—were bombarded by neutrons (see ATOM AND ATOMIC THEORY). These atomic changes are known as nuclear fission. They differ from ordinary radioactive ones not only in the production of much larger amounts of energy, but also because they may, under certain circumstances, form a chain reaction. During nuclear fission other neutrons are set free, and these, by collision with atomic nuclei, generate further supplies of energy, and still more neutrons. The result of this chain reaction is that, if the mass of material is of sufficient size for more than a certain fraction of the secondary neutrons to undergo nuclear collisions before they escape into the surrounding space, an enormous amount of energy is released in a very short time, and the material acts as an immensely powerful explosive. Since sufficient neutrons are always present to initiate the chain reaction, any mass of the material greater than a certain critical one is self-detonating, whereas smaller masses, from which neutrons can escape without nuclear collision, are not explosive.

A committee was set up in Great Britain in 1940 to investigate the possible use of atomic fission in a bomb, and similar work was undertaken about the same time in the U.S.A. It soon became apparent that such a weapon was a possibility, and after the U.S.A. entered the war the scientists of the 2 countries collaborated closely in its development. Owing to the greater facilities available in America the large-scale work of production was undertaken there. Among the problems to be solved were: (a) the isolation in considerable quantities of the rare isotope of uranium, U235, which is present in ordinary uranium to the extent of 0.7 per cent

only. The commoner isotope, U238, is unsuitable; (b) the measurement of the distances neutrons travel in U235 without collision with nuclei, and of the number and speeds of neutrons set free during fission. These factors determine the critical mass, above which the bomb will be explosive; (c) the design of the bomb itself. Owing to the peculiarities of U235 as an explosive, the bomb must be carried to its destination in parts the union of which causes it to explode. If, however, the parts are brought together slowly they will be driven apart again as the reaction is initiated, and it will cease before it has proceeded far. To permit more than a negligible fraction of the available energy to be released the 2 parts of the bomb must collide at a speed comparable to that of a high velocity shell from a gun.

The solution of such problems and the production of sufficient quantities of the atomic explosive had been achieved in 1945, and 2 A. B.s were dropped on the Jap. cities of Hiroshima and Nagasaki. The enormous devastation caused, and the knowledge that they were powerless to prevent further attacks of a similar nature, were important factors in influencing Jap. leaders to sue for peace, and Japan surrendered shortly afterwards. In 1945 an Atomic Energy Research Estab. was set up at Harwell, and 2 years later Britain's first atomic pile, GLEEP (Graphite low energy experimental pile), started operating for the production of pure graphite and uranium. In 1948 the second atomic pile, BEPO (British experimental pile), started working at Harwell for the production of plutonium from irradiated uranium. In 1949 an atomic estab. was constructed in Cheshire whose purpose was the separation of U238 from the rarer U235 atoms by gaseous diffusion. In 1950 the Atomic Weapons Research Estab. was constructed in Berkshire and in 1952 Britain's first test of an atomic weapon took place at Montebello Is., Australia. A year later 2 further similar tests took place at Emu Field on the mainland of Australia. See ATOM AND ATOMIC THEORY; HYDROGEN BOMB; THERMONUCLEAR REACTIONS.

Atomic Clock, device for the calibration of standard clocks and proposed as a basis for a new standard of time, the 'physical second.' A resonant frequency of the caesium atom is detected by very high frequency radio waves, and has been found to be at 9,192,632,050 cycles per sec. by Essen and Parry (1955) at the National Physical Laboratory. This is known to 1 part in 10^9 , and is much more stable than the best quartz controlled oscillators. The accuracy is the highest ever achieved in the measurement of a physical quantity in terms of a definitive standard. See HOROLOGY; METROLOGY; PHYSICAL UNITS.

Atomic Energy, see NUCLEAR POWER.

Atomic Energy Commission, United States. Estab. by the Atomic Energy Act of 1948, the commission's purpose was to serve as a national control body, with 6 divs. of activity: research,

production, engineering, military application, reactors, and biology and medicine. There was much controversy over the question of whether the commission should be a civilian or a military organization; but when it was set up it was predominantly civilian. The 5 members were appointed by the president, with the advice and consent of the Senate. David E. Lillenthal was the first head of the commission.

Atomic Heat, capacity for heat possessed by the atoms of different elements. Dulong and Petit, by a careful determination of the specific heat of 13 of the solid elements in 1819, showed that the product of atomic weight and specific heat was constant. Its value is about 6.2 ± 0.4 calories per degree. They therefore concluded that the specific heat of the substances varies inversely with the atomic weight and proposed to adopt as the atomic weights those numbers which, multiplied by the specific heat, gave a constant product. Within certain limits of temp. the theory is true for the greater number of elements in the solid state. Thus if we take a number of grammes of an element equal numerically to the atomic weight, as, for instance, 35.5 grammes of chlorine, 12 grammes of carbon, we find that they require approximately the same amount of heat to raise their temp. 1°C . The theory has been useful in determining the atomic weight in doubtful cases.

Atomic Number, number of positive elementary charges on the nucleus, i.e. number of protons in the nucleus, and therefore the number of electrons surrounding the nucleus of a neutral atom. It is the property of the atom (q.v.) which mainly determines its spectroscopic and chemical characteristics. See NUCLEUS and ISOTOPES.

Atomic Physics, see ALPHA PARTICLES; ATOM AND ATOMIC THEORY; BETA PARTICLES; COSMIC RADIATION; CYCLOTRON; ELECTRON; ELECTRON MICROSCOPE; GAMMA RAYS; GEIGER-MUELLER COUNTER; HYPERONS; INDETERMINACY PRINCIPLE; ISOTOPES; MESONS; NEUTRINO; NEUTRON; NUCLEAR POWER; NUCLEUS, ATOMIC; OIL-DROP EXPERIMENT; POSITRON; PROTON; QUANTUM THEORY; RADIATION; RADIOACTIVITY; RADIUM; THERMO-NUCLEAR REACTION; TRANSMUTATION OF THE ELEMENTS; TRANSURANIC ELEMENTS; VAN DE GRAAFF MACHINE; WAVE MECHANICS; X-RAYS.

Atomic Power, see ATOMIC BOMB and NUCLEAR POWER.

Atonality, style of musical composing without conscious reference to any scale or tonic. The desire to elude a fixed tonality (key) is as old as Mozart, but the term was first applied—wrongly—to the work of Arnold Schoenberg (q.v.). The sources may be traced through the chromatic harmony of Wagner's *Tristan*. A. also came about through building up dissonances on every degree of the chromatic scale, so that each degree gains the function of a dominant. Debussy achieves atonal effects often through the use of the whole-tone scale.

Atonement, derived from the phrase 'at one,' and used to translate the Heb. *kippur* and the Gk *katalage* (which occurs only once in the N.T., at Rom. v. 11), a word which expresses the idea of a reconciliation between God and man. It implies that an otherwise amicable or benevolent relationship has been interrupted by some fault on man's part, whether the offence is purely ceremonial, or moral. The concept of A. covers all forms of ingratitude, reparation, satisfaction, expiation, and propitiation. These activities are common to all religions, and indeed to all personal relationships between man and man, as well as between man and God. The richest and most dramatic embodiment of them, in religion, is the act of sacrifice. The final and perfect A. was effected by Jesus Christ; His death and Resurrection made Him the Sacrifice that puts an end to all others. This fact was a central feature of the Apostolic preaching from the start. There was, however, no single consistent and systematic explanation given of the way in which the A. worked, what it has actually done, and how and why.

No really systematic theory of the A. in fact was produced until the time of St Anselm, who in his treatise *Cur Deus Homo?* explained the A. as necessary to satisfy the honour of God, and the offering of Christ as of sufficient value to outweigh man's sins. This is sometimes referred to as the commercial theory. In St Anselm's belief A. was necessary; but this was controverted by Abélard, who held that God could have forgiven sin without requiring equivalent satisfaction. St Bernard held to the old idea of the A. as a ransom from the devil, necessary for man's redemption, an opinion adopted by St Thomas Aquinas, admitting, however, only a conditional necessity for the A. by Christ's death. The chief teaching at the Reformation was on the substitutionary basis, holding that, to satisfy the divine justice, Christ bore a punishment equivalent to that deserved by man. Later theories were that of Socinus, teaching that the Crucifixion was an assurance of God's love and an example of obedience, and the governmental theory of Grotius, to the effect that the A. took place to further the divine gov. of the world by exhibiting God's hatred of moral evil.

See H. N. Oxenham, *The Catholic Doctrine of the Atonement* (3rd ed.), 1881; A. Ritschl, *The Christian Doctrine of Justification and Reconciliation*, trans. 1900; R. C. Moberley, *Atonement and Personality*, 1901; J. Denny, *Death of Christ*, 1903; G. B. Stevens, *Christian Doctrine of Salvation*, 1905; H. Rashdall, *The Idea of the Atonement in Christian Theology*, 1919; L. W. Grensted, *A Short History of the Doctrine of Atonement*, 1920; J. K. Mozley, *The Heart of the Gospel*, 1925; R. S. Franks, *The Atonement*, 1934; G. Aulen (W. Hebert), *Christus Victor*, 1936; L. Hodgson, *Doctrine of the Atonement*, 1951.

Atossa, Queen of Persia, daughter of Cyrus. and wife successively of Cambyases,

Smerdis the usurper, and Darius Hystaspis, to whom she bore Xerxes and 3 other sons, and whom she influenced to invade Greece. She is mentioned by Herodotus and is a prominent character in the *Persae* of Aeschylus.

Atrato, riv. of Chocó dept in W. Colombia, rising in the W. Cordilleras, at an elevation of over 10,000 ft. It flows almost due N. for 400 m. into the Gulf of Darien, forming a large but not navigable delta.

Atreabates, anct tribe of Belgic Gaul, whose cap. was Nemetacum. They formed a confederacy with the Nervii against Julius Caesar, by whom they were utterly defeated on the Sambre. A branch of them settled in Britain, in the area of the modern Berks. From their name came the modern Artois (prov. of France) and Arras.

Atrek, or **Attrek**, riv. in the N. of Persia, flows partly along the frontier, then into the S.E. corner of the Caspian Sea. It is 250 m. in length, and almost dry at the mouth during the summer.

Atreus, legendary son of Pelops and Hippodamia, and brother of Thyestes. For the murder of their step-brother Chrysippus, A. and Thyestes were forced to flee to Mycenae, where A. became king. Thyestes seduced Aërope, his brother's wife, and was driven from the country. To avenge himself he sent Pleisthenes, a son of A. by his first wife, to kill his father, but A. slew him without recognising him. It was now the turn of A. to plan vengeance. He pretended reconciliation with Thyestes, and having slain his 2 sons served them up to him at a banquet. Thyestes fled in horror. Later A., ignorant of her family, married Pelopia, the daughter of Thyestes, and adopted Aegisthus, her son by Thyestes. Agamemnon and Menelaus, the son of A. by Aërope, found Thyestes and took him to their father. Thyestes was imprisoned, and A. sent Aegisthus to kill him. But Thyestes recognised his son by the sword with which the latter intended to slay him, and having made himself known to Aegisthus, he and his son decided to kill A. They did so, and seized the throne. There are numerous variants of the story.

Atri, It. in Abruzzi e Molise (q.v.), 14 m. S.E. of Teramo (q.v.). It has a fine Gothic cathedral. Pop. 13,200.

Atria, see **ADRIA**.

Atriplex, genus of herbs and shrubs, family Chenopodiaceae, 110 species. *A. hortensis*, known as Orach, is an ann., grown as a vegetable, and substitute for spinach.

Atrium, in a Rom. house, was usually a central open court around which the various rooms were grouped, but the name seems to have been occasionally applied to the prin. room. In early basilican churches, the enclosed courtyard in front of the church is generally called the A.

Atropa, genus of Solanaceae, of two species. *A. belladonna*, deadly nightshade or Dwale, grows in thickets and hedges of Britain, and has a purple bell-shaped flower. It contains *atropine*, from which belladonna is made; the drug

is used in medicine in cases of nervous diseases, and when dropped in the eye causes a dilatation of the pupil. The berries are poisonous, as are the roots and leaves.

Atropatene, anct name of S. Azerbaijan (see **AZERBAIJAN**).

Atrophy, diminution in the size of a tissue or organ, the result of degeneration of the cells or a decrease in the size of the cells. The immediate cause of degeneration is the cessation or diminution of the supply of nutriment to the part. The opposite condition is *hypertrophy* (q.v.) when increased nutrition causes an enlargement of the tissues. A. may be due to loss of functional activity when such activity has become unnecessary, as in some embryonic appendages, the shrivelling of the ovaries after the child-bearing period, etc. It thus plays an important part in the process of evolution, procuring that a part which is no longer used gradually passes out of existence. A. occurs when the normal blood supply is obstructed by accident, disease, or deliberate constriction. Yellow A. of the liver is an acute disease of doubtful etiology. It is characterised by increasing jaundice, vomiting, the presence of a large amount of bile, with leucine and tyrosine in the urine, and is almost invariably fatal.

Atropine ($C_{17}H_{23}NO_3$), alkaloid obtained from belladonna leaves or root. It is used in medicine as a sedative and local anodyne. In large doses the drug is a powerful poison, producing hallucinations, delirium, and a marked stimulation of the heart, which ultimately becomes paralysed. It lessens secretions, especially the saliva, bronchial secretion, and gastric fluid. When dropped into the eye A. causes marked dilatation of the pupil. It is used externally to relieve neuralgia, and in small doses as an antidote to opium poisoning.

Atropos (Gk. for 'implacable'), the eldest of the Fates, cut the thread of human life, measured by Clotho and drawn out by Lachesis. In art she bears scissors, scales, or a sun-dial. See **MOIRAE**.

Attaché (Fr. 'attached'), subordinate attached to the suite or company of a commanding officer. In practice the term is restricted to military or naval A.s, who are young diplomatic officers attached to an embassy or a legation, or travelling with an ambas. to a foreign country. It is their duty to make themselves familiar in an honest fashion with the naval and military condition of the country they are in, and to report on all matters likely to be of interest and value to the home gov. In time of war there are various A.s at the H.Q. of each army. This post is then generally conceded to the envoys of those foreign powers who need representatives at the seat of war.

Attachment, legal process by which a defendant may be brought before a court by the taking of his person or his goods. The writ is issued to the sheriff. It is a process properly applicable to the offence

of contempt of court, and therefore is not necessary where the offence has been committed in open court, for the offender is then present, and can be dealt with without the necessity for A. It differs from arrest in that it can be effected on a man's goods as well as his body, and also that the person attached is kept till the day appointed and not brought before a court at once. It differs from distress in that it is not applicable to lands, but only to goods. County courts can only punish for contempt in presence of the court, and therefore cannot issue writs of A.

Attachment of debts. By the Common Law Procedure Act, 1854, and Judicature Act, 1873, a creditor, after obtaining judgment against a debtor, and after affidavit that the debt is not paid and that debts are owed to the debtor by a third party, may attach all such debts and issue execution if the third party does not dispute the debts. Wages of a servant, labourer, or workman (Wages Attachment Abolition Act, 1870), and of a seaman or apprentice (Merchant Shipping Act, 1894), are not open to A.

Foreign attachment. A legal process peculiar to the Mayor's Court in London and also in Bristol, Exeter, and Lancaster, by which a creditor may, before judgment, attach money owed to the debtor or property belonging to him in the hands of third parties. *See also* GARNISHMENT.

Attainder (Norman-Fr. *ataindre*; Lat. *attingere*, to reach, to touch upon). The erroneous derivation of the word from the Lat. *tingere*, to dye, to taint, had far-reaching consequences on the Eng. common law, giving rise, as it did, to the doctrine of corruption of blood. A. was the consequence which followed the passing of sentence of death upon a criminal, or of outlawry in capital felonies, outlawry in these cases being equivalent to a sentence of death. By the sentence the prisoner became *attainted*, that is to say he lost all power over his property, and was incapable of performing any of the duties, or enjoying any of the privileges, of a freeman. The blood of the prisoner was said to be corrupt or tainted, neither land nor titles descending to his heirs. By an Act of 1870 A. was abolished in the U.K. In Eng. hist. there have been frequent instances of A.s by express legislative enactments providing for the attainder and punishment of persons held to be guilty of offence against the peace and security of the State; they were known as Bills of A., or Bills of Pains and Penalties. The effect of such a Bill was to supersede the ordinary process of law, and although the imprisonment and execution of persons by this means were entirely legal (as coming from the source of law, Parliament), yet in both its employment and its administration it was quite arbitrary. Persons were attainted upon mere hearsay evidence, and some upon no evidence at all, without being heard in their defence. The practice of introducing Bills of A. into Parliament arose in the reign of Richard III, somewhere about

1477, and by the end of the reign of Henry VIII scarcely a year passed without persons of the highest rank being brought to the scaffold by this means. Under the Stuarts recourse was seldom had to this proceeding, but it was adopted by the Long Parliament against Strafford and Laud. The last execution to take place by means of an Act of A. was in 1697.

Attaint, writ, which formerly lay to inquire whether a jury had given a false verdict. It was first introduced by Henry II at, it is said, the instance of the Justiciar Glanville. At first it only lay on the trial of writs of assize, but it was extended gradually, and by the reign of Edward III it applied to all pleas whatsoever, whether real or personal, except writs of right, where the issue was joined on the *mere right*. If the jury on the A., who were 24 in number, found that the verdict was false, the judgment against the jury who found the false verdict was very severe. But more moderate judgment was introduced in the reigns of Henry VII and Elizabeth I. So ineffectual, however, was this proceeding that in the time of James I it gave place to the now existing practice of setting aside verdicts on motion and granting new trials. By 6 Geo. IV. c. 50, which consolidated the laws relating to juries, proceedings by way of a writ of A. were abolished.

Attalea, family Palmaceae, genus of tropical Amer. palms; *A. funifera*, Pissaba palm, yields very strong, fine fibres for ropes and brooms.

Attalla, or **Attaleia**, anct seaport on the coast of Pamphylia, near the mouth of the R. Catarrhaetes, and about 15 m. distant from Perga. It was built by Attalus II (159-138 bc) and subdued by the Romans under P. Servilius Isauricus. It is now named Adalia (q.v.). The place was visited by Paul on his first missionary journey (Acts xiv. 25).

Attalus, general under Philip II of Macedon, and uncle of Cleopatra, whom Philip espoused c. 337 bc. At the wedding he offended Alexander, son of Olympias, whom Philip had repudiated, by expressing a wish for a *legitimate* successor to the throne. After the death of Philip he opposed Alexander, but his soldiers deserted him and he was slain.

Attalus, name borne by 3 Kings of Pergamum:

1. Surnamed Soter, reigned 241-197 bc, became an ally of Rome in that city's struggle against Philip of Macedon and the Achaeans. He was wealthy, just, and wise, and a liberal patron of literature.

2. Surnamed Philadelphus, son of the foregoing, reigned 159-138 bc, succeeded his brother Kumenes II. Like his father, he was an ally of Rome and a great patron of the arts.

3. Surnamed Philometor, nephew of the foregoing, reigned 138-133 bc; by his will left Pergamum to the Rom. people. There are conflicting accounts of his life.

Attalus, Rom. senator and prefect of the city in ad 409, when he was appointed emperor by Alaric in opposition to

Honorius. He was soon afterwards deposed by the Goth, to whose successors he attached himself; but when Vallia concluded a peace with Honorius, A. was banished to Lipari after having the fingers of his right hand cut off in order to prevent him writing. He d. some years later in obscurity at Rome.

Attar of Roses, essence or oil of the red *Rosa damascena* or the pinkish *Rosa centifolia*, produced from the petals of these flowers by distillation in water stills heated either by open fire or by steam. The distillate flows from the condensers into the receivers (Florentine flasks) where the oil separates on the surface, being removed either by pipette or spoon and collected in glass bottles. The condensed rose water, which contains the major portion of the oil dissolved or in suspension, is transferred to other stills for redistillation. The yields from the first and second distillations are mixed and constitute the Rose Oil of commerce. About 3500 kilos of rose blossoms yield 1 kilo of oil. The bulk of the world production is prepared in Bulgaria, yearly about 700 kg., exported in officially sealed 1-kg. copper flasks. Small quantities are distilled in France, Turkey (Anatolian oil), Persia, Tunis. The perfume is very costly, and is in itself too strong to be at all pleasant. It is sparingly used as an ingredient in luxury perfumes, a few drops of it scenting a great quantity. It is also known as Otto of Roses.

Attempt, technical term in criminal law applied to an act done with the intent to commit a crime. In England any act which if uninterrupted and successful would have been a crime is regarded as an A., even if the accused of his own free will decides not to carry out his original intent. Attempts are generally misdemeanours, although by statute attempts to murder or commit arson are felonies.

Attention. In psychology two kinds of A. are recognised: (1) The passive, being the concentration of the consciousness upon a definite object or objects by isolating the perception from other objects. As all consciousness depends upon a certain degree of isolation, such passive A. may ultimately be regarded as the necessary condition of consciousness. (2) The active, being the voluntary act of fixing the mind upon a definite object or objects. The force of this act of volition varies with the individual, and is capable of development.

Attenuation, the relative decrease in power of a signal with increasing distance from the input. If V_1 and V_2 are the input and output voltages in a network, the A. in decibels is given by $D = 20 \log_{10} (V_1/V_2)$.

Atter, Lake, see SALZKAMMERGUT.

Atterborn, Per Daniel Amadeus (1790-1855), Swedish poet and critic, b. Åsbo. He studied at the univ. of Upsala, where he founded the Aurora League, a society for the reform of Swedish literature and the propagation of the new romantic ideals. The best known of his works are two poetic dramas, *Fädjel Blå* (incomplete)

and *Lycksalighetens Ö*, 1824-7, and the series of lyrics entitled *Blommorna*, 1812-1836, which introduced the sonnet to Sweden. His works are marred by a tendency to introduce philosophic and religious meditations and obscure allegory. In 1835 he was made prof. of literature at Upsala. See C. Santesson, *Atterborn Studier*, 1932, and H. Frykenstedt, *Atterborns Lycksalighetens Ö*, 1951.

Atterbury, Francis (1662-1732), Bishop of Rochester, distinguished as an Eng. man of letters, a bishop, and a politician, was b. at Middleton Keynes in Buckinghamshire. He was educ. at Westminster School, from which he proceeded to Christ Church, Oxford. He took holy orders in 1687, and readily swore allegiance to William III after the revolution. He won great fame as a preacher, and became in 1691 lecturer of St Bride's, chaplain to William and Mary, and minister to Bridewell Hospital. In 1698 appeared the Hon. Charles Boyle's attack on Bentley's *Dissertation on the Epistles of Phalaris*, an attack which was mainly from the pen of A., who was Boyle's tutor. He distinguished himself also by his defence of the rights of convocation against the prevailing Erastianism. In 1701 he became an archdeacon, a prebendary of Exeter Cathedral, and a D.D. In 1704 he became dean of Carlisle, in 1709 preacher at the Rolls Chapel, in 1712 dean of Christ Church, in 1713 bishop of Rochester and dean of Westminster. He was probably instrumental in the drawing up of Sacheverell's defence. He took part in the coronation of George I, but his influence was destroyed, since his leanings towards Jacobitism were known. In 1717 he held direct communication with the Pretender. In 1721 he was arrested for participation in a plot to proclaim King James, and in 1722 imprisoned in the Tower. In 1723 he was deprived of his titles and banished. He entered the service of the old Pretender and d. in France in 1732. He was buried secretly in Westminster Abbey. He numbered amongst his friends and correspondents all the great literary men of the period.

Attercliffe, formerly a township in the par. of Sheffield (q.v.), with its vil. on the R. Don, now a ward of the city. Here are the steel-works for which the city is famous. Pop. 16,450.

Attestation. Most important legal documents, especially wills and deeds (q.v.), require to have the signature of the person making the instrument attested by one or more witnesses or 'attesters.' All deeds are required by Scots law to have 2 witnesses, unless there is special statutory exemption, and in England wills and grants of land to charities must have 2 attestors. In Scotland no deed is valid if written by another than the party making the deed unless the testing clause (q.v.) is regular. One witness is necessary to a bill of sale, and to witness a warrant of attorney or a cognovit (i.e. an admission by a defendant of the justice of the whole or part of a plaintiff's claim) the signature of a solicitor is obligatory.

Atthis, genus of small humming-birds found in SW. U.S.A. and elsewhere.

Attico. In classical architecture, a low storey or stage above the main entablature, in the elevation of a building. In modern architecture, a room in the roof. Used as an adjective, the 'A. base' is found in the Ionic and Corinthian Orders, and consists of two convex toruses separated by a concave scotia, resting upon a plain square plinth.

Attic Dialect. The language of Athens was originally a subdivision of the Ionic dialect, which was one of the 8 main dialects of anct Greece. These dialects are distinguished into 4 groups: Ionic, Arcadian-Cypriote, Aeolic, and Western. When Athens became the spiritual cap. of Greece, and particularly from the early 4th cent. BC onwards, the A. D. became the lingua franca of the Ionic cities, and with the conquests of Alexander the Great it became the *koiné* of the Hellenistic world, though only by about AD 500 were all the other dialects extinct.

Attica, one of the divs. of anct Greece, of which Athens was the cap.; bounded on the N. by Boeotia, on the W. by Megaris and the Saronic Gulf, on the S. by the Aegean Sea. It was a fertile and prosperous state, and sent out many colonies. Striking features of the country are the mts of Hymettus and Laurium, the latter of which contained silver mines.

Atticism, elegant and classic phrase, characterised by brevity and intellect. Attica was the dist. round Athens, and the Attic dialect was the purest and most literary of the Gk dialects. *Attic sail* signifies a poignant and delicate wit peculiar to the refined Athenians and foreign to the blunter Romans.

Atticus, Quintus Caecilius Pomponianus (109-32 BC), Rom. *eques*, patron of letters, and financier. His original name was **Titus Pomponius**. Leaving Rome in 86, shortly before the outbreak of civil war, he settled at Athens, earning by his long residence there, and by his profound knowledge of Gk literature, the name **Atticus**. On his return to Rome in 65 he took possession of an estate bequeathed him by his uncle Q. Caecilius and assumed the name Q. Caecilius Pomponianus. He refused to take sides in the war between Caesar and Pompey, remaining on friendly terms with the leaders of both parties. A. is best known for his friendship with Cicero and ed. that section of the orator's letters called *Ad Atticum*. Believing himself to suffer from an incurable disease he starved himself to death. See also BOOKSELLING. See G. Boissier, *Cicéron et ses Amis*, 1888.

Atticus Herodes, Tiberius Claudius (c. AD 101-77), Gk rhetorician, b. Marathon. His fame as a teacher of rhetoric was equally known at Rome and at Athens. Among the more famous of his pupils were the future emperors Marcus Aurelius and L. Verus. He became consul in the year 143. He was exceedingly wealthy, and spent a great part of his riches in beautifying Athens and Corinth.

Atticus, Titus Pomponius, see ATTICUS, QUINTUS CAECILIUS POMPONIANUS.

Attidian Brethren, body of 12 priests with wide authority in Umbria. The Eugubine Tablets are the records of their acts.

Attila (the Scourge of God) (c. AD 400-453), King of the Huns, succeeded his uncle Rua or Roua with his brother Bleda in 434. He claimed for himself divine origin and descent, and the dominion of the whole world. Bleda was put to death in 445, and A. proclaimed himself King of the Barbarians from the N. Sea to the boundaries of China. He ruled over the Vandals, Ostrogoths, and Gepidae. In alliance with Genseric he invaded Moesia and defeated the forces of Theodosius II. He devastated the whole of the E. portion of the empire; the emperor was forced to pay him tribute and to cede him ter. (447), and Constantinople only saved itself by means of its impregnable fortifications. The whole of the Balkan Peninsula was at his mercy. In 450 A. prepared to invade Gaul. He laid siege to the tn of Orleans in 451, but an alliance of the Romans and Visigoths forced him to raise it and decisively defeated him at Chalons. But the victors allowed A. to retreat unhindered into Hungary. He reorganised his forces, and invaded Italy in the following year, place after place falling into his hands. He took and completely destroyed Aquileia (q.v.) in 452, after a siege of 3 months. Rome itself was only saved at huge expense—though according to one tradition A. did not attack Rome in consequence of his interview with Pope Leo the Great. In the next year he d. suddenly, possibly by poison, and with the death of A. his empire fell to pieces. See life by M. Bison, 1929, and E. A. Thompson, *A History of Attila and the Huns*, 1948.

Attis, see ATYS.

Attis, see ACCIUS.

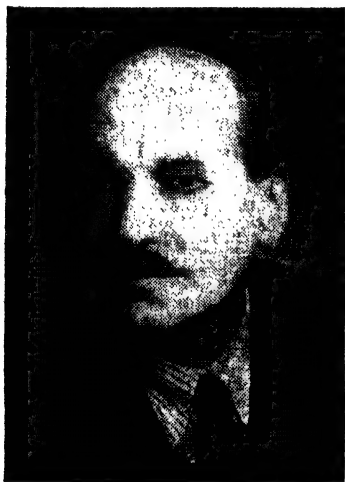
Attie, miner's term for dirt or rubbish left over after the ore is worked. Originally a Cornish term.

Attleboro, tn of Bristol co., Massachusetts, U.S.A., 32 m. SW. of Boston. A. manufs. jewellery, silverware, and cotton goods, and has bleaching and dyeing, paper and metal specialities, optical goods, tool, and machinery industries. Pop. 23,810.

Attleborough, mrik tn in Norfolk, England, 15 m. SW. of Norwich by rail. In the 14th cent. it had a college of the Holy Cross, and its par. church contains some interesting remains. A disastrous fire destroyed much of the tn in 1559. Turkey-rearing and elder-making are carried on. Pop. 2600.

Attlee, Clement Richard, 1st Earl (1883-), statesman, b. Putney, and educ. at Haileybury and Univ. College, Oxford, where his politics were Conservative. After leaving Oxford his experiences working in an E. End of London social settlement, coupled with his reading of the works of Morris and Ruskin, converted him to Socialism. He was called to the Bar, 1905, and was secretary of Toynbee Hall, 1910. He lectured on social science, London School of Economics, 1913-23, and served in the First

World War, retiring with rank of major, 1919. Mayor of Stepney, 1919-20. He was elected M.P. (Labour) for the Limehouse div. of Stepney in 1922, retaining this seat until 1950. From 1950 to 1955 he represented W. Walthamstow. Member of India commission, 1927-30; under-secretary for war, 1924. Chancellor of Duchy of Lancaster, 1930-1; postmaster-general, 1931. In the crisis of 1931 he stayed out with Arthur Henderson, J. R. Clynes, and George Lansbury, preferring the political wilderness and his friends to the high places with Ramsay MacDonald and J. H. Thomas, and in the ensuing



Karsh, Ottawa

EARL ATTLEE

general election his group suffered a heavy defeat. However, Lansbury came back and A. became deputy leader of the parl. Labour party. He succeeded George Lansbury as leader of the Labour party, 1935. Privy councillor, 1935. A. was leader of the Opposition when the Second World War broke out and he joined Churchill's coalition Gov. in May 1940 as lord privy seal and leader of the House of Commons. From 1942 to 1943 he was dominions secretary; lord president of the council, 1943-5; and deputy prime minister, 1943-5. In the general election of 1945 A. fought on a programme of extensive social reform and nationalisation. The Labour party gained an overwhelming victory and A. became prime minister. He carried out the promises of his election programme with vigour, pursuing a foreign policy which was the logical development of his predecessor's, involving close contacts with W. Europe and the U.S.A., while attempting to maintain friendly relations with Russia, a course which became increasingly

difficult. His premiership covered a period of great economic crisis. A. showed great force of character and a drive and leadership which amazed even his closest supporters; in the past he had been thought of primarily as a capable administrator. He remained prime minister after the general election of 1950, but his party's majority had dropped considerably. At the election 18 months later the Conservatives returned to power and A. became once again leader of the Opposition. In 1955 the Conservatives retained and increased their parl. majority. In Dec. 1955 A. resigned from leadership of the parl. Labour party and from the House of Commons. He was granted an earldom, 1955, and created K.G. in 1956. Since then he has only spoken infrequently on political affairs, but has lectured, both at home and abroad, on social questions.

Attock, tn and fort of Pakistan, in the Punjab. It is situated on the l. b. of the Indus, 45 m. ESE. of Peshawar, and was founded in 1581 by the Emperor Akbar. It is an important strategic position, as here is the chief bridge over the Indus. It has been the route by which almost all the invaders of India by land—Alexander, Tamerlane, etc.—have made their approach.

Attorney, 'one substituted' (from *atourné*, *atournatus*, respectively derived from the Fr. *atourner* and the Lat. *atournare*, to substitute), signifies in its widest sense one put in the place or *turn* of another to manage his affairs. For its use in this general sense see article POWER OF ATTORNEY. In the narrower sense A., or more properly attorney-at-law, was the name given prior to the Judicature Acts, 1873-5, to those members of the legal profession who represented litigants in the courts of common law and briefed counsel on their clients' behalf. The equivalent term for those who practised in the chancery or equity courts was solicitor. Since the enactment above referred to, which extended equity to all courts, the title of solicitor is applied to both solicitors and A.s. See, therefore, article SOLICITOR. In the U.S.A. the term A. includes both barristers and solicitors.

Attorney, Letter or Power of, see POWER OF ATTORNEY.

Attorney-General. The A.-G. is the chief law officer of the Crown and chief legal adviser of the gov. He is appointed by letters patent, and his office is in many respects similar to that of the lord advocate of Scotland (q.v.), though less extensive and more clearly defined. Originally he was simply the king's attorney, and stood in the same relationship to the king as any other attorney does to his client. The additional term 'general' probably arose from the need of differentiating him from attorneys appointed to act for the Crown in particular courts, such as the attorney for the courts of wards, or the 'coroner and attorney for the king,' the official name for the master of the Crown office in the King's Bench Div. The origin of the

office is obscure, the first mention of the title being in the reign of Edward I towards the end of the 13th cent., when the holder of it is called the *attornatus regis*. Gradually the office has become one of great dignity and importance. The king's serjeant was at one time the chief officer of the Crown in criminal proceedings. A dispute between this officer and the A.-G. as to precedence was settled in 1811 by George IV, then prince regent, declaring by a special warrant that the A.-G. and the solicitor-general should have precedence over all other members of the Eng. Bar. A similar problem as to precedence between the lord advocate of Scotland and the A.-G. arose in 1834, and was decided in favour of the latter. The A.-G., like his confrère the solicitor-general, is always a member of Parliament and a member of the ministry. He is paid £10,000 a year, and receives fees for Crown business, but he has not now the right that he formerly enjoyed of engaging in private practice. Till 1912 the A.-G., though a member of the ministry, was not a member of the Cabinet or of the Privy Council, but in that year Sir Rufus Isaacs, M.P. (later Lord Chief Justice), was given a seat in the Cabinet. The duties of the A.-G. are to represent the Crown in criminal prosecutions, particularly in those heinous misdemeanours that tend to disturb or endanger the State, and in civil cases to conduct suits and prosecutions relating to public questions of professional etiquette. The duchies of Cornwall and Lancaster and the co. palatine of Durham each have their A.-G. The A.-G. of the U.S.A. Gov. differs in some respects from his Eng. prototype. The lawyer chosen for this post is always a lawyer of eminence, though not necessarily in the front rank of the Bar, political considerations having, as in England, much to do with determining the President's choice. The A.-G. exercises a general supervision over the Federal judicial departments, and more especially over the district attorneys (see STATE ATTORNEY) and those executive court officers called U.S. marshals. Further, he is a fully fledged member of the President's Cabinet, and is the regular legal advisor of the President, a function of especial importance in all those difficult questions which arise as to the constitutional limits of the executive power of the President, and the relations of Federal to state authority. In England the A.-G.'s opinions are treated as confidential, but those of the Amer. A.-G. are often pub. officially, not only in justification of any particular line of action taken by the President, but to inform the world of the view which the executive takes of its legal position and duties in any matter of moment. These opinions have a quasi-judicial authority although they are only of 'persuasive' and not 'authoritative' efficacy, inasmuch as the Federal Court can override them. See J. Bryce, *American Commonwealth*, 1890.

Attracted Disk Electrometer, see ELECTROMETER.

Attraction, condition of stress such that two bodies tend mutually to approach one another, and to resist separation. There are various kinds of A., such as the universal gravitational A. which regulates the movements of all the heavenly bodies, molecular A., electrical A., magnetic A., etc. The laws of gravitation (q.v.) were first formulated by Newton, and can be expressed in the simple formula $F = \frac{Gmm'}{r^2}$, where F is

the force of A. between two particles of masses m and m' , r their distance apart, and G the constant of gravitation.

Attrek, see ATREK.

Attribute, in painting, an A. is a conventional symbol added to identify the personage represented.

Atwood, Thomas (1765-1838), organist and composer, son of a coal merchant. He was sent by the Prince of Wales to study music in Italy, and he also visited Vienna in 1785, where he was a pupil of Mozart. On his return he became organist of St Paul's, and composer to the Chapel Royal.

Atur, Aturis, or Aturus, see ANOUR.

Atwood, George (1746-1807), mathematician and physicist, was b. in London. He was educ. at Trinity College, Cambridge, and having graduated with high honours was elected a fellow of the Royal Society in 1776. He wrote various papers for *Philosophical Transactions*, and among his other works may be named his *Treatise on the Rectilinear Motion and Rotation of Bodies, with a Description of Original Experiments Relative to the Subject*, 1784, which described the apparatus known as A.'s machine, to demonstrate the laws regulating falling bodies.

Atwood's Machine, apparatus designed to study the motion of a falling body. It consists essentially of a wheel over which 2 masses are suspended, weighing respectively, say, 49½ grammes and 50½ grammes. The total mass is therefore 100 grammes, and the force acting upon the machine is due to the excess in weight of one body over the other, that is, 1 gramme-weight. Let this gramme be a piece of wire which can be removed by a plug on one of the supports of the wheel. A pendulum is provided which regulates a timepiece. The heavier weight is supported by a plate which can be dropped as the pendulum ticks. The position of the ring is adjusted so that the weight takes exactly 1 sec. to reach it, which can be arranged after some trial by making the click of the wire on the ring and the tick of the pendulum coincide. The weight, relieved of the wire, still travels downwards until it is stopped by a plate arranged as before to catch it at the end of 1 sec. This plate will be found to be about 9.81 centimetres below the ring. That is to say, the weight of 1 gramme, acting for 1 sec., has imparted to the whole mass of 100 grammes a velocity of 9.81 centimetres per sec. This additional velocity is a measure of the acceleration due to gravity. The

force due to gravity acting on 1 gramme may be measured in dynes by multiplying the total mass by its acceleration, thus: $F = ma = 100 \times 9.81 = 981$ dynes. Many other experiments can be carried out with A.'s M., which are explained in text books on dynamics. See M. Davidson, *Introduction to Dynamics*, 1949.

Atya, name give by Leach to a genus of long-tailed decapodous crustacea. They have forceps ending in 4 claws; these are cleft as far as the base and thus appear to be composed of 2 fingers, or lashes, which are joined at their origin.

Atys, or **Attis**, deity of vegetation originally worshipped in Phrygia, consort of Cybele. His death, according to a widely accepted version, from the wound of a wild boar, was annually mourned, and his resurrection was celebrated by the priests of his cult.

Aubagne, Fr. tn in the dept of Bouches-du-Rhône, on the Huveaune. It has jade and pottery industries, and is an important market (pigs, fruit). Pop. 6600.

Aubaine, anct Fr. right by which the property belonging to strangers (not naturalised) or to Frenchmen who left their country became on their decease the property of the lord of the dist. or of the king. It was abolished in 1819.

Aubanel, **Théodore** (1829-86), Fr. author, b. Avignon. In collaboration with Mistral and Roumanille he devoted himself to the work of reviving and carrying on the native Provençal dialect and literature. He kept up, however, his family trade of printing and editing. His best-known poem is *La Miougrano entreduberto*, 1860. One play of his, *Lou pan dou pecat*, 1878, was acted in Provençal and in French.

Aube, dept of NE. France, bounded N. by Marne, NW. by Seine-et-Marne, W. by Yonne, S. by Yonne and Côte-d'Or, and E. by Haute-Marne. It is formed of the S. part of the old prov. of Champagne and part of Burgundy. Its E. part is watered by the A. and its W. by the Seine, to the basin of which the dept belongs. The climate is moist and mild, and the chief industry is agriculture. The NE. is chiefly pastoral, but the SW. is fertile, and here wheat, oats, vegetables, etc., are extensively cultivated. Chalk, potter's clay, building-stone, and limestone are among the minerals, while cotton-spinning and weaving are the chief industries. Prin. exports, timber, cereals, wine. Troyes (the cap.), Bar-sur-Aube, Nogent-sur-Seine, Arcis-sur-Aube, Romilly-sur-Seine (qq.v.) are the prin. tns. Area 2326 sq. m.; pop. 235,000.

Aube, trib. of the Upper Seine, rises in plateau of Langres. Length 150 m.

Auber, **Daniel François Esprit** (1782-1871), Fr. composer of operas, b. Caen in Normandy. His father, a print-seller, sent him to London to acquire a knowledge of business methods, but the young man was already deeply imbued with a passion for music, to indulge which he returned to Paris in 1804. After producing 4 concertos for the violoncello and 1 for the violin he reser the comic opera *L'Erreur d'un moment*. Intending

to study music seriously, he now put himself under the tuition of Cherubini, and after writing a mass, part of which he later utilised in *La Muette de Portici*, he produced a one-act opera, *Le Séjour militaire*, 1813, which failed miserably. This failure led him to write nothing more until he was compelled by the death of his father in 1819 to make music his means of livelihood. After a half-success in *Les Testaments et les billets-doux*, he scored a brilliant success in 1820 with *La Bergère châteline*. In 1822 he began his association with E. Scribe, the libretto-writer, and the two began a series of popular and successful productions, among which may be named *Le Maçon*, 1825, *Fra Diavolo*, 1830, *Le Cheval de bronze*, 1835, *Le Domino noir*, 1837, *Les Diamants de la couronne*, 1841, *La Part du Diable*, 1843, and *Manon Lescaut* (after Prévost), 1856. *La Muette de Portici* (*Masanillo*), 1828, is a landmark in operatic advance and *Gustave III*, 1833, is an earlier treatment of the subject of Verdi's *Un ballo in maschera*.

Aubergine, or **Egg Plant**, fruit o *Solanum melongena* var. *ovigerum* and var. *esculentum*, of Africa and S. Asia; grown under glass in Britain for its egg-shaped edible fruits. Also known as Bringall, Jew's Apple, Mad Apple.

Aubervilliers, Fr. tn in the dept of Seine, on the St-Denis canal. It is a NE. suburb of Paris. Formerly there was a pilgrimage in honour of Notre-Dame-des-Vertus. There are oil refineries and numerous chemical manufs. Pop. 52,800.

Aubignac, **François Hédelin**, **Abbé d'** (1604-76), Fr. author and critic, b. Paris. He was tutor to the nephew of Richelieu, who conferred on him the abbey of A. His best-known work is a tragedy, *Zénobie*, 1647, written in prose as an exemplification of critical rules, and he later arranged these in his *Pratique du théâtre* (4 vols.), 1657. He was the first to throw doubts on the existence of Homer.

Aubigné, **Françoise d'**, see MAINTENON.

Aubigné, **Jean Henri Merle d'** (1794-1872), Swiss historian of the Reformation, b. Eaux-Vives, Geneva. He studied there and at Berlin until, in 1818, he became pastor of the Fr. Protestant church at Hamburg. Five years later he removed to Brussels, where he was appointed court preacher. In 1830 he returned to Geneva and became prof. of church hist. in the newly founded theological school there. He visited England on sev. occasions, where he was warmly welcomed, the univ. of Oxford conferring the D.C.L. degree on him. His best-known work is *Histoire de la Réformation au XVI^e siècle*, 1835-53.

Aubigné, **Théodore Agrippa d'** (1552-1630), Fr. soldier and scholar, b. Pons in Saintonge. He early showed a remarkable talent for languages, especially for the classics, but his attachment to the Huguenot cause made him spend the early part of his life in the military profession. He rendered good service to Henry of Navarre, whom he later criticised with freedom and candour. After

Henry's assassination he retired to Geneva and resumed his literary studies. His best-known work is his *Histoire universelle*, 1560-1601, 1616-19, which for its indulgence in satire was officially burnt in France. His poems, *Les Tragiques*, 1577-1616, are full of emotional force and religious zeal, and undoubtedly rank with the great Fr. poems. See J. Plattard, *A. d'Aubigné*, 1935.

Aubin, Fr. tn in the dept of Aveyron, on the Enne. It is in a coal and iron mining dist. Pop. 4600.

Aubonne, Baron d', see TAVERNIER.

Aubrey, John (1626-97), antiquary, b. Easton Percy in Wilts, and educ. at Malnesbury Grammar School, under Robert Latimer. In 1642 he entered Trinity College, Oxford, and in 1646 became a student of the Middle Temple, though he was never called to the Bar. Only one of his works, the *Miscellanies*, was pub. in his lifetime (1696), but he left a large mass of material which was ed. by others. His *Lives of Eminent Men*, given to Anthony a Wood as material for his *Athenae Oxonienses*, appeared in 1813, and his *Remains of Gentilisme and Judaïsme* in 1881. His *Natural History and Antiquities of the County of Surrey* had already appeared in 1719. The *Miscellanies* (stories about dreams, ghosts, and visions) are full of interesting chatter, but A.'s extreme credulity and his appetite for folklore and gossip sometimes make them unreliable. His valuable and entertaining *Brief Lives of Contemporaries between 1669 and 1696* was ed. in 1898 by Andrew Clark from the MSS. in the Bodleian.

Aubriet, Claude, Fr. artist, b. Châlons-sur-Marne c. 1655. He succeeded Jean Joubert in 1700 as painter for the Jardin du Roi. He is noted for his beautiful illustrations of natural hist. on vellum, and many of his works are preserved in the National Library.

Aubrieta, family Cruciferae, genus of trailing evergreen plants, of which *A. deltoidea* and varieties are most commonly grown under the popular name of Aubrietia.

Aubry de la Boucharderie, Count Claude Charles (1773-1813), general of artillery, was b. at Bourg. He fought in several campaigns, of which the chief was the expedition to Moscow, during which he constructed the famous bridge over the Beresina. He was slain at Leipzig in 1813.

Aubry de Montdidier (fl. c. 1370), nobleman at the court of Charles V of France, assassinated in 1371, it is said, by his companion Richard Macaire. A.'s dog afterwards showed the most determined animosity to Macaire, and the king, his suspicious being roused, ordered a combat between the two. The dog, says the popular story, was the victor, and Macaire, having confessed to the murder, d. on the scaffold. The story is almost certainly legendary, since similar versions occur at a much earlier date, one in Plutarch.

Auburn: 1. Co. seat of Cayuga co., New York, U.S.A., situated at the N. end

of Owasco Lake; has manufs. of wool, silk, car accessories, plastics, textiles, surgical instruments, chemicals, boots, paper, etc., and also makes agric. machinery on a large scale. There is a state prison here, founded in 1816, which accommodates over 1000 prisoners. Pop. 36,720.

2. Co. seat of Androscoggin co., Maine, U.S.A.; it manufs. boots and shoes, and has canneries. Pop. 23,134.

Auburn, or Lissoy, vill. of co. Westmeath, Rep. of I., 6 m. NE. of Athlone, is Goldsmith's boyhood home, and the 'Sweet Auburn' of *The Deserted Village*.

Aubusson, Pierre d' (1423-1503), grand master of the order of St John of Jerusalem. He served under the Emperor Sigismund and the Dauphin, afterwards Louis XI. He joined the order of the Knights at Rhodes, was signally successful against the pirates of the Levant, and successfully resisted Mohammed's siege of Rhodes in 1480. He perfidiously kept captive Jem, one of the brothers claiming Mohammed's throne, until the other brother, Bayezid, was successful, when he handed Jem over to Pope Innocent VIII in 1489. He was rewarded by being made a cardinal.

Aubusson, Fr. tn, cap. of an arron., in the dept of Creuse, in the gorge of the R. Creuse. It is celebrated for its carpets and tapestry, and has a small metal industry. Pop. 5000.

Aucaners, see NETHERLANDS GUIANA. 'Aucassin et Nicolette,' medieval romance (Arabic in origin and Provençal in setting), in mixed prose and verse, of the 13th cent. It resembles the story of the much more popular *Floire et Blanchefleur*. A. was the son of the count of Beaucaire; N., though looked upon as a slave, was in reality the daughter of the King of Carthage. In a simple and touching narrative the story of their vicissitudes, their long separation, and their final happiness is realistically told. Sedaine wrote the libretto for an opera by Grétry, which was first performed in 1779. Other composers, including Enna, the Dane, have set versions of the story. See *Aucassin and Nicolette* (Everyman's Library).

Auch (Rom. Augusta Auscorum), Fr. tn, cap. of the dept of Gers, on the Gers. It was the ant. cap. of Gascony, and of Armagnac (qq.v.). It is the seat of an archbishop, and has one of the finest Gothic cathedrals in France. It has textile manufs., and a trade in brandy, horses, and poultry. Pop. 11,500.

Auchel, Fr. tn in the dept of Pas-de-Calais. It has coal-mines and brickworks. Pop. 10,600.

Auchenia (Gk. *auchēn*, neck), scientific name of the llama (q.v.), a ruminant of the family Camelidae and order Ungulata. It is smaller than the camel, has woolly hair, no hump, and is very vicious.

Auchinleck, Sir Claude John Eyre (1884-), soldier, b. Ulster, son of Col. John Claude A., R.A., educ. at Wellington College. Served in Egypt, 1914-15, and elsewhere in the Middle E. during the First

World War. Mohmand operations, 1935. Deputy Chief of General Staff Army H.Q., India, 1936-8. G.O.C. Southern Command, 1940. Earned the reputation of an expert in mountain warfare before the outbreak of the Second World War. Was Commander-in-Chief in India in the early part of the war; in July 1941, when Gen. (later F.M.) Wavell relinquished the chief command in the Middle E., A. succeeded to that command, and at a time when the Brit. forces were still inadequately equipped. On 18 Nov. 1941 A. launched a new offensive. It snatched victory at Sidi Rezegh, relieved Tobruk, and, on 24 Dec., recaptured Benghazi; but it failed before the lines at El Agheila, and a Ger. counter-offensive threw it back to Gazala in the middle of Cyrenaica. After some months' quiescence, Rommel (q.v.) attacked; Tobruk fell, and the Brit. retreat continued to El Alamein, when Gen. (later F.M.) Montgomery succeeded A. A. then became Commander-in-Chief in India for the second time, and it is probable that his greatest service in the course of the war was that he rendered in India when the whole responsibility for the administrative background to the campaign in Burma lay upon him. He won the confidence of the Indian Army, and his flair for the political work which fell to him made him equally successful in council. Promoted to field marshal, 1 June 1946. Commander of the combined force operating in the Punjab, 1947. Retired soon after the declaration of Indian independence.

Auchinleck, tn in Ayrshire, Scotland, 15 m. E. of Ayr. In the par. is A. House, the seat of the Boswell family. Pop. (tn and par.) 6800.

Auchterarder, royal burgh (c. 1200) in Perthshire, Scotland, 14 m. SW. of Perth. It was the opposition to the presbiter to the church of A., in 1839, which began the contest leading to the formation of the Free Church of Scotland. A. manufs. tweeds and tartans, angora wool, and cashmere. Pop. 3100.

Auchtermuchty, royal and police burgh of Fifeshire, Scotland, 9 m. from Cupar, and native tn of John Glas, founder of the sect of the Glasites in 1725. Iron-founding, beam and scale manuf., and hosiery-making are carried on. Pop. 1350.

Auckland, George Eden, 1st Earl of (1784-1849), Brit. statesman, son of the first Baron A. In 1835 he was made Governor-General of India. The successful beginning of the Afghan war, 1838-9, won him his earldom.

Auckland, William Eden, 1st Baron (1744-1814), statesman, educ. at Eton and Christ Church, Oxford. He was chief secretary to the Irish viceroy, and in charge of a commission which treated with the Irish insurgents. As minister plenipotentiary to France he concluded a commercial treaty in 1786, and was afterwards ambas. to Spain and Holland, and postmaster-general. He was created Baron A. in 1789.

Auckland, name of a prov. dist. of New Zealand and also of the chief tn of that

dist. 1. A. prov. dist. (area 25,400 sq. m.) includes practically half of the N. Is., being 400 m. long and 200 m. wide at its greatest breadth. The heavily indented N. peninsula was the site of the earliest mission settlements and the cradle of civilisation in New Zealand. Christened by enthusiasts 'the winterless north', its almost sub-tropical climate has attracted many Brit. settlers after service in tropical countries. The Waikato area to the S. of A. city includes some of the world's finest grasslands and is a prin. centre of the country's dairy industry. Soils in the prov. dist. range from a light volcanic loam to a stiff yellow clay. Great progress has been made in bringing into production, by the introduction of cobalt and other means, the pumice-lands in the Rotorua area. Minerals found in the prov. dist. include coal, gold, copper, tin, and iron, and an oil survey is proceeding. The kauri pine, of which the fossil gum is exported, once fl., but only remnants of the great kauri forests now remain, notably in the Waipoua National Reserve. The thermal wonderland of the S. part of the prov. dist. is world-famous and Lake Taupo in the centre of the N. Is. is renowned for its trout-fishing. Pop. of prov. dist., about 850,000.

2. The city of A., on the E. coast, lies in lat. 36° 51' S. and long. 174° 45' E., having mean temps. (summer) 65·2, (autumn) 60·5, (winter) 52·2, and (spring) 57·1; mean annual rainfall is 43·09 in. A. was founded in 1840 by the first governor, Capt. Wm Hobson. It remained the cap. of New Zealand until 1865. It has splendid wharves and graving docks on Waitemata Harbour, and a second harbour in Manukau on the W. coast, only 6 m. distant. It has an international airport, with Tasman Empire Airways and other services linking New Zealand with the rest of the world. A bridge is being built across the harbour. The value of exports from the port of A. in 1953 was £85 million, some £40 million more than from the next largest port, Wellington. Imports were valued at £67 million in the same year, about £8 million more than Wellington's total.

The city, fortunate in its benefactors, has some fine libraries, art collections, parks, and homes for crippled children and the blind. The War Memorial Museum is one of the best in the S. hemisphere. A. Univ. College, a constituent college of the univ. of New Zealand, is centrally sited. A.'s main industries include sugar refining, ship and boat building, ammunition manufacturing, fruit canning, freezing works, boot and shoe factories, breweries, pottery, brick, tile, and varnish works. Pop. of urb. area, 380,412.

Auckland Isles, group of is. situated 180 m. S. of New Zealand, were discovered by the whaler *Bristow* in 1806. Enderby, Adams, and Auckland are the chief is. They are valuable as whaling stations, but have no settled inhab.

Auction, method employed for the sale of property, which derives its name from the Lat. *auccio*, an increase, because the

property was publicly sold to him who would offer most for it. The usual form of A. is to offer the property at a low figure, and by the competition of the various bidders, each offering a little more than the predecessor, to raise the price to that point beyond which the bidders refuse to go. The goods are then 'knocked down' to the highest bidder. The Dutch A., originating, as its name indicates, in Holland, is the reverse of this, and is a method generally employed by the cheap-jack. The property is offered at a higher price than is likely to be paid for it, and the price is gradually lowered till somebody bids for it. The first person to bid gets the property. The mere offer of a bid does not bind the bidder until the auctioneer brings down his hammer, which is the equivalent of accepting it. Until such time a bidder may, if he chooses, withdraw his bid. It has been laid down that the buyer of goods at an A. is not bound to perform his contract if he was the only bona fide bidder at the sale, and if public notice was not given of the intention of the vendor to bid. This applies even though his agent was authorised to bid only to a certain sum. This rule is to protect purchasers against the practice of employing persons to make mock biddings with a view to raising the price by their apparent competition. The acceptance of a bid is generally indicated by the auctioneer striking his rostrum with a small hammer (wooden), but sometimes lighted candles are employed to measure the time during which bids will be entertained. The length of candle generally employed is 1 in., and the last bidder before the light expires is the purchaser. Yet another method employed is the running out of sand in the sandglass. Formerly excise duties were payable on sales by A., being first imposed during the Amer. war of Independence, in 1777. As much as \$329,000 was raised by this means in one year, but in 1845 the duty was repealed. In 1927 Parliament, feeling the need for further control of A.s, passed the Auctions (Bidding Agreements) Act, 1927. This was directed against the evil of the 'knock-out'; in other words, the prior agreement between a ring of possible bidders that one only of their number should make a bid and that the advantage gained by this course of action should be shared by the members of the ring. The Act directs that, under penalty of £20 for non-compliance, the name and address of the auctioneer, together with a copy of the Act, shall be exhibited before and during the sale.

Auctioneer's powers and duties. The auctioneer's duty is previously to the commencement of every sale to intimate to intending purchasers the conditions under which the sale takes place, but for the purposes of the Act it is considered sufficient if these conditions are posted up in the A. room. Every auctioneer is required by the Auctioneers' Act, 1845, to take out an ann. licence, which expires on 5 July, and for which £10 is paid, but the same statute specifically exempts

certain sales. Such sales include goods sold under a distress for rent when the amount does not exceed £20. In such cases the sale may be conducted by the bailiffs without a licence. The penalty for selling goods by A. without a licence is £100, but the lack of a licence does not render such a sale nugatory. The ordinary licence entitles the holder to act as an appraiser also, but for the sale of dutiable goods an additional licence is required. An auctioneer has certain statutory exemptions and liabilities. Thus he is held responsible for the safe custody of goods entrusted to him for sale, and he is liable to an action for selling goods to which the person who employs him has no title, though in this matter he is afforded some relief by the Factors Act. He is debarred from purchasing for himself the property he exposes for sale. On the other hand, the auctioneer himself has power to sue the bidder for fulfilment of contract, and has a lien on the vendor's goods for his commission and expenses. If the vendor sells the goods by private sale after the auctioneer has unsuccessfully exposed them for sale, then the auctioneer is entitled to a commission as if he himself had sold them. He is also not liable to the vendor for the price bid for the goods until he has received it. The number of licensed auctioneers in the U.K. exceeds 8000, about three-quarters of whom are members of the Auctioneers' and Estate Agents' Institute, London. The institute, which watches carefully all legislation affecting its members, was founded in 1886.

Auction Bridge developed from bridge and became popular about the year 1911. The prin. innovation was the introduction of competitive bidding. At bridge (q.v.) only the dealer or his partner had the privilege of determining whether the hand should be played in a trump suit or at no trumps; in A. B. the final declaration was put to auction between the four players. The dealer either bid or passed, thus opening the auction; each player in succession to the left then called until the final call determined the contract, which could be doubled by the opposing side and re-doubled by declarer or his partner. On the completion of the auction, the player who originated the contract played his own and his partner's hand (dummy).

Various modifications in scoring were introduced between 1911 and 1929. The advantage of playing at no trumps owing to its higher score led to a change in the valuation of the suits, clubs counting 6, diamonds 7, hearts 8, spades 9, and no trumps 10. A further step towards levelling the suit values was the introduction of 'majority calling' which was later adopted in Contract Bridge. By this law the number of tricks contracted for, irrespective of the suit, and not their value, decided the higher bid. All points scored in fulfilment of a contract counted towards game; failure involved penalties scored by the opponents 'above the line,' which were graded in proportion to the declarer's degree of success. Thirty points constituted game and 250 points

were added for the rubber. *See also* CONTRACT BRIDGE.

Aucuba, genus of Cornaceae, a dioecious plant native to Asia. *A. japonica*, the Japan laurel, is cultivated in Britain as a hardy evergreen shrub.

Aude, dept. of S. France formed from part of the anct prov. of Languedoc. It is bounded on the E. by the Mediterranean. In the S. the spurs of the Pyrenees reach 4037 ft in the Pech de Bugarach, while the offsets of the Cévennes in the N. reach 4018 ft. The greater part of the dept. lies in the valley of the lower A. The wine-producing dist. of the Narbonne in the E. is bordered by a flat, sandy coastal belt in which are sev. lagoons, rich in fish. Cereals, olives, almonds, and vegetables are produced, livestock is raised, and there are splendid vineyards. Iron, lead, cobalt, and arsenic are mined, and there are textile, foodstuff, and hydro-electric industries. There are sev. spas. The prin. tns are Carcassonne (the cap.), Limoux, and Narbonne (qq.v.). Area 2448 sq. m.; pop. 268,250.

Audebert, Jean Baptiste (1759-1800), Fr. artist and naturalist, b. Rochefort and studied at Paris. Having attained a reputation as a painter of miniatures, he turned his attention to natural hist., and in 1800 produced a hist. of the apes beautifully illustrated in colour. Two other works, on the humming-birds and the birds of paradise, the latter left unfinished, were pub. after his death. He was the originator of the method of using gold-leaf to depict the plumage of birds. *See* his *Oiseaux dorés ou à reflets métalliques*.

Auden, Wystan Hugh (1907-), poet, b. York, son of a doctor. Educ. at Gresham's School and Christ Church, Oxford, he was a schoolmaster in this country for a short time. His first pub. work, *Poems*, 1930, was followed by *The Orators*, 1932, *The Dance of Death*, 1933, and *Look, Stranger*, 1936. Though not a Communist, he became the leader of a new school of Leftist poets who were prominent in the decade before the Second World War, and whose work shows the influence of T. S. Eliot (q.v.). In 1937 he served as a stretcher-bearer in the Sp. Civil War, wrote a poem, *Spain*, and was awarded the king's medal for poetry. He was co-editor of an anthology, *The Poet's Tongue*, 1935, based on the principle that poetry is 'memorable speech,' and editor of the *Oxford Book of Light Verse*, 1938. He married Erika Mann, daughter of the Ger. novelist, and in 1938 moved to the United States, adopted Amer. citizenship, and taught in a number of Amer. colleges and univs. In 1956 he was elected prof. of poetry at Oxford. His later vols. of verse include *Another Time*, 1940, *New Year Letter*, 1941, *For the Time Being*, 1945, *Nones*, 1952, and *The Shield of Achilles*, 1955; in collaboration with Christopher Isherwood (q.v.) he wrote three verse plays, *The Dog Beneath the Skin*, 1935, *The Ascent of F6*, 1936, and *On the Frontier*, 1938. Though often very close to conversational

speech, A.'s poetry does not always escape the obscurity common among poets of his period. His work is difficult to assess because he has no definite style, but his influence on contemporary writers was considerable. *See* F. Searle, *Auden and After*, 1942, and *W. H. Auden*, 1949.

Audenarde, *see* OUDENARDE.

Audenshaw, tn of Lancs, England, 4 m. E. of Manchester. Pop. 13,000.

Audhumla (Audumbia), the cow made by Surt, whose milk fed the first created being, the giant Ymir (q.v.), and his race in Scandinavian mythology.

Audians, or **Audeans**, sect of heretics founded by Audius or Audeus (4th cent.). He attacked the clergy and the gov. of the Church, and when he assumed the episcopal office was banished by Constantius to Scythia. The opinions and practices of Audius and his followers were: the celebration of Easter after the usage of the Jews; the admission of all persons indiscriminately to the Lord's Supper; the doctrine of the eternity of fire, water, and darkness, and especially that of anthropomorphism, or the resemblance of the Deity to the human form.

Audincourt, Fr. tn in the dept of Doubs, on the Doubs. It has an iron-works, and manufs. machinery and textiles. Pop. 8700.

Audiometer, adaptation of the telephone designed to measure the acuteness of hearing.

Audio-typist. With the extensive introduction into offices of recording machines into which letters are dictated and subsequently transcribed by a typist it has become necessary to make a distinction between typists carrying out this type of work and those who copy from manuscript (copy typist) or transcribe from shorthand (shorthand typist or stenographer). Because transcription from recording machines is done direct from the spoken word through headphones connected to the machine the typist is called an A. *See also* DICTATING MACHINES.

Audiphone, instrument for transmitting sound vibrations to the bones of the head. It consists of a plate of thin vulcanite, bent and kept by strings under a certain degree of tension. The edge is placed in contact with the front teeth, by which means sound is rendered audible to those whose auditory ossicles fail in their functions.

Audit Ale, strong ale brewed for use at Oxford and Cambridge colleges on A. day.

Audita Querela, form of action allowed to a defendant, against whom judgment has been entered and is about to be enforced, which enables him to obtain a stay of execution, if he can show that some matter has occurred since judgment which amounts to a discharge. In some of the states of the U.S.A. it has been superseded by the granting of summary relief upon motions.

Auditor, person appointed to examine the accounts of the State, a public body or corporation, a company, or of a private person, and to certify that they are correct and properly kept. The duties of an A. are those of an accountant, and are in all

cases of importance performed by a professional accountant. All payments and receipts must be proved by vouchers, but A.s must also certify to the accuracy of balance sheets and of the statements as to revenue, etc. (See ACCOUNTANT.) In the Companies Act, 1900, incorporated in the Act of 1908, strict provisions are made for the appointment and remuneration of A.s, and their rights and duties are clearly laid down. The latest provisions are embodied in the Companies Act, 1948. Before 1900 regulations as to the audit of company accounts were left to the articles of association, except in the case of joint-stock banks. The Society of Accountants and A.s was incorporated in 1885. In the Brit. civil service the exchequer and audit dept plays an important part. The comptroller and A.-general in 1866 replaced the comptroller-general of the exchequer and the commissioners for auditing the public accounts. As comptroller he authorises issues from the exchequer in accordance with accounts that have received parl. sanction, and authorises borrowings to meet deficiencies; he examines the daily accounts furnished by the Bank of England as to the payments paid to the exchequer account; as A.-general he ascertains whether money expended has been applied to the purpose for which it was granted, and generally verifies the public accounts and reports to Parliament (see also LOCAL GOVERNMENT, AUDIT OF ACCOUNTS OF). In the U.S.A. the federal and state gov.s., together with the municipalities, have their accounts submitted to public A.s. The accounts of the Federal Gov. are audited by a comptroller-general, who is the chief official of the general accounting office. The comptroller-general operates through an audit div., which is quite independent of the executive gov., being solely responsible to Congress direct. With the exception of the accounts of the post office, which are audited by their own A.s, the post office div. (co-ordinated with the audit div.), all the central gov.'s accounts are submitted to the comptroller-general's dept. The Fr. public audit dept is styled *Cour des Comptes*; the Ger. *Rechnungshof*. In Scotland an A. of the court is equivalent to the Eng. taxing-master. See also COMPANY AND COMPANY LAW.

Auditory Nerves, special nerves connected with the sense of hearing. They rise from the *medulla oblongata* as the eighth pair, or, according to some anatomists, the *portio mollis* as the seventh pair, of cranial nerves, and pass downward to the ear. See BRAIN AND EAR.

Audley, Sir James (d. 1386). Eng. soldier, one of the original knights of the order of the Garter, founded in 1344 by Edward III. He greatly distinguished himself at the battle of Poitiers, was governor of Aquitaine in 1362, and great seneschal of Poitou in 1369.

Audley, Thomas, Baron Audley of Walden (1488-1544), lawyer, native of Essex. He studied at Cambridge and the Middle Temple, and afterwards became a member of Wolsey's household. In 1529

he became Speaker of the House of Commons and was made chancellor in 1533. A. was created a peer in 1538. He supported the annulment of Henry VIII's marriage to Catherine of Aragon; presided at More's and Fisher's trials; and passed judgment on Anne Boleyn and Catherine Howard. He founded Magdalene College, Cambridge.

Audley, par. of Staffs, England, 4½ m. NW. of Newcastle under Lyme. Pop. 10,000.

Audley End, see SAFFRON WALDEN.

Audouin, Jean Victor (1797-1841). Fr. entomologist, b. Paris. He began to study law, but his strong natural inclination led him to the study of the natural sciences, and of medicine. He was made prof. of entomology at the Jardin des Plantes in 1833. He made the study of insects his speciality, and wrote on this subject and on the natural hist. of the coasts of France. His chief work, *Histoire des insectes nuisibles à la vigne*, was continued after his death by Milne-Edwards and Blanchard and pub. in 1842.

Audran, Edmond (1840-1901). Fr. musical composer, b. Lyons. He was originally intended to enter the Church, but his tastes were for the musical profession, and he became a church organist at Marseilles. He was first brought to the popular notice by his operetta *L'Ours et le Pacha* in 1862. He afterwards produced a number of melodious, light, and graceful operettas and comic operas, such as *La Mascotte*, 1880, *La Cigale*, 1886, and *La Pouppée*, 1896.

Audran, Gérard (1640-1703). Fr. engraver, b. Lyons and studied in Rome. He obtained considerable fame by his portrait engravings, including that of Pope Clement IX, and was appointed engraver to Louis XIV.

Audubon, John James (1780-1851), celebrated Amer. ornithologist, b. Louisiana. He was educ. at Paris, and studied drawing under David. His father estab. him on a plantation in Pennsylvania, and in 1808 he married the daughter of a farmer, Miss Lucy Bake-well. His ardour for the study of natural hist. was indomitable. Annually for 15 years he explored the primeval forests of America, and as he was able to transfer the results of his labours to paper with a spirited hand, his works have great value. His *Birds of America* (1827-38) was praised in enthusiastic terms by Curvier. He was of an unassuming and deeply religious nature, handsome in form and feature, and of a keen and clear-sighted intelligence. See life by Buchanan (Everyman's Library); C. Rourke, *Audubon*, 1936; G. C. Fisher, *Life of Audubon*, 1949.

Aue, Ger. tn in the dist. of Karl-Marx-Stadt, in the Erzgebirge (q.v.), on the Zwickauer Mulde, 20 m. SSW. of Karl-Marx-Stadt (q.v.). It is in a uranium-mining dist., and has textile, machinery, and chemical industries. Pop. 26,000.

Auenbrugger von Auenbrugger, Leopold (1722-1809). Austrian physician, b. Graz in Styria. He became physician to the Sp. Hospital at Vienna. His *Inventum*

Novum, 1761, gave an account of his application of the laws of acoustics to the investigation of the phenomena or action of the internal parts of the body; his work first introduced percussion (q.v.) as a means of detecting chest diseases. Although trans. into French by Rozière de la Chassagne in 1770, it was almost completely ignored until J. N. Corvisart (q.v.) adopted the method and pub. his classical trans. (1808). Eng. trans. by J. Forbes, 1824.

Auer, Väinö (1895-), Finnish scientist, internationally known for his geological research work in Patagonia and Canada on land erosion.

Auerbach, Berthold (1812-82), Ger. author of Heb. extraction, b. Nordstetten in the Black Forest. He originally studied theology, but later turned to law, and from law to hist. and philosophy, making a special study of Spinoza. He made his name in 1843 with a vol. of vil. stories, *Schwarzwälder Dorfgeschichten*. His later philosophical novels, such as *Auf der Höhe*, 1885, mostly concerned with the evolution of the thought of individuals, are clever, but tedious. He is at his best in his vil. stories, which had a considerable influence on European literature. His *Gesammelte Schriften* were pub. in 22 vols. in 1863-4.

Auersperg, Anton Alexander, Count of (1806-76), Austrian poet, b. Laibach. He was elected a member for life of the Upper House of the Austrian Reichsrath in 1861. In political affairs he was distinguished by his liberalism and his Ger. leanings. It is, however, under his *nom de plume* of Anastasius Grün that he is best known. He wrote patriotic verse full of idealism, the most famous being his *Spaziergänge eines Wiener Poeten*, 1831, and also humorous poems, as *Der Pfaff vom Kahlenberg*.

Auerstädt, Duke of, see DAVOUT.

Auerstädt, Ger. vil. in the dist. of Halle, 30 m. SW. of Halle (q.v.). The French under Davout (q.v.) routed the Prussians with heavy loss here in 1806. Pop. 900.

Auffenberg-Komarov, Moritz, Freiherr von (1852-1928), Austrian field-marshal (1905), and war minister (1911-12); b. Troppau, son of Hofrath Auffenberg. Took part in occupation of Bosnia, 1878; in charge at Sarajevo, under Archduke Franz Ferdinand (q.v.). With the Fourth Army he was victorious at Komarov, Sept. 1914; but his force proved unable to cope with superior numbers of Russians at Lemberg later. In 1915 tried for alleged irregularities as war minister, and acquitted.

Aufrecht, Theodor (Simon) (1822-1907), Sanskritist and linguist, b. Leschnitz in Upper Silesia. 1852, assistant at the Bodleian Library, Oxford; 1862, prof. of Sanskrit and comparative philology at Edinburgh Univ.; 1875-89, at Bonn Univ. With A. Kuhn he founded the *Zeitschrift für vergleichende Sprachforschung* (1851). Pub. *De accentu compositorum Sanscriticorum*, 1847; (ed. with Kirchhoff) *Die umbrischen Sprachdenkmäler* (2 vols.), 1849-51; *Die Hymnen des Rigveda* (2 vols.), 2nd ed., 1877;

Aitareya Brāhmaṇa, 1879; and other works. His chief works are scientific catalogues of Sanskrit MSS.: *Catalogue Catalogorum* (3 vols.), 1891-1903, *A Catalogue of post-Vedic codices*, 1859-64, and *A Catalogue of Sanskrit MSS. in the Library of Trinity College, Cambridge*.

Augean Stables. Augeas, King of the Epelans in Elis, was an Argonaut, and owned 30,000 head of cattle, including 12 white bulls sacred to the Sun. Their accumulated dung Heracles cleared from the A. S. in a day, as required by Eurystheus, diverting the R. Alpheus into them. The term is now used metaphorically. See HERCULES.

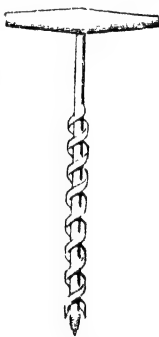
Auger, Athanase (1734-92), Fr. classical scholar. He early applied himself to the study of the Gk and Rom. writers, and was appointed prof. of rhetoric in the college of Rouen. Besides translating sev. classical and patristic authors, A. wrote an essay on the constitution of Rome; *Projet d'éducation publique, précédé de quelques réflexions sur l'Assemblée nationale*, 1789; and *Catéchisme du citoyen français*, 1791.

Auger, boring tool with a centring point, one or two radial cutting edges, and an Archimedes screw for removing material as the tool advances. It may be with or without a handle; earth A.s may be driven either by two men on a transverse handle or by a power attachment on a truck. The small carpenter's A. is used for boring wood.

Augereau, Pierre François Charles, Duke of Castiglione (1757-1816), marshal of France, b. Paris. He served in the Neapolitan army till 1787, and volunteered for the Fr. army in 1792. His conduct in Vendée and the Pyrenees was so brilliant that he was general of div. in 1793. Sent to the It. army, he highly distinguished himself at Lodi, Castiglione, and Bologna. He took part in the *coup d'état* of Fructidor 18 (4 Sept.), and was a member of the Council of Five Hundred in 1799; in 1804 he was created marshal of the empire and grand officer of the Legion of Honour. He submitted to Louis XVIII on Napoleon's abdication, and was created a peer.

Aughrim: 1. Vil. of co. Galway, Rep. of Ireland, 5 m. SW. of Ballinasloe, where the famous battle of A. was fought on 12 July 1691, between the armies of James II under the Irish Gen. St Ruth, who was killed, and those of William III under Gen. Ginkel.

2. Vil. of co. Wicklow, Rep. of Ireland, in the mt valleys which culminate in Lugnaquilla (3039 ft), the bp. of Anne Devlin. Garrett and Wm Byrne, '98 leaders, were b. at Ballymanus House.



AUGER

A. has granite quarries and flour mills. Pop. 350.

Augier, Guillaume Victor Émile (1820–1889), Fr. dramatic poet, b. Valence. He was educ. as a lawyer, but soon turned his attention to literature. Among his plays are *Le Pils de Giboyer*, 1863, *Contagion*, 1866, and *Les Effrontés*, 1893, all satires on avarice, social demoralisation, and lust of power; *Marriage d'Olympe*, showing the unidealised courtesan, 1855; *Jean de Thommeray* (with Jules Sandeau), 1873, sounding the note of patriotism, following Fr. reverses in 1870; and *Les Fourchambault*, 1878, on the Dumas model. His *Le Gendre de M. Poirier*, 1854 (prose), also with Sandeau, still holds its place. A. defended the common-sense view against sophistry. He did not, however, take up the attitude of a reformer or an apostle. He was made a member of the Academy in 1858, a commander of the Legion of Honour in 1868. See P. Morillot, *E. Augier*, 1901, and H. Gaillard, *E. Augier et la comédie sociale*, 1910.

Augite (Gk *augē*, lustre), important mineral belonging to the pyroxene group. It is often found in volcanic rocks. It is green when in fibrous masses, black when it crystallises, and is distinguished from hornblende by its crystals, which are smaller and thicker.

Augmentation is used with special significance in heraldry, in music, and in Scots law.

In heraldry, an additional charge to a coat-of-arms is known as an **A.** The right to add such a charge is conferred as a mark of honour. A well-known case of **A.** is the Union flag borne by the Duke of Wellington.

In music, especially in counterpoint and fugue, **A.** is the repetition of a phrase or subject in notes of twice the original length.

In Scots law, **A.** is an increase of stipend obtained by a par. minister in the court of teinds by a process of **A.** against the titulars and heritors. See also **BENEFICE** and **TEINDS**.

Augmentation, Court of, court set up by Henry VIII in 1536 to manage the revenues and possessions of all monasteries under £200 a year, which by a previous Act of the same session had been given to the king, and for determining suits relating thereto. The origin of the title of this court is seen by referring to its full title, 'The Court of the Augmentation of the revenues of the King's Crown.' It was a court of record, with one great seal and one privy seal. It was dissolved in 1553.

Augrabies Falls, on the Orange R. in Cape prov., S. Africa, 79 m. W. of Upington. They are 480 ft in height, or about twice as high as the Niagara Falls, though the latter are much wider and have a greater flow of water. **A.** is the Hottentot name for 'The Place of Great Noise.'

Augsburg (anc. *Augusta Vindelicorum*), Ger. city in the *Land* of Bavaria (q.v.), at the junction of the Wertach and Lech (q.v.) R.s, 37 m. WNW. of Munich (q.v.). It was founded in 15 BC and

became an important tn of Rhaetia (q.v.). In the 5th cent. it was laid waste by the Huns (q.v.). In the 6th cent. it was made a bishopric, and in 1276 it was made a free city of the Empire. It reached the summit of its prosperity under the Emperor Maximilian I (q.v.) at the beginning of the 16th cent., when it was the home of powerful merchant families such as the Fuggers (q.v.) and the Welsers. At this period **A.** was also a great art centre: Holbein the Younger was a native of the city, and among the other artists who worked in it were Dürer, Titian, Burgkmair, and Altdorfer (qq.v.). Sev. important events of the Reformation (q.v.) took place at **A.** (see succeeding articles, and see LUTHER, MARTIN). The city was occupied by the Swedes during the Thirty Years War (q.v.), was in Bavarian hands, 1703–4, and finally became part of Bavaria in 1806 on the abolition of the Empire. During the Second World War there was considerable damage from air-raids. The cathedral (10th–15th cents.) has altars by Holbein the Elder, and contains the oldest stained glass in the world (11th cent.). There are other fine medieval and Renaissance churches; a 17th-cent. tn hall, which is one of the most notable Renaissance buildings in Germany; a beautiful Renaissance street, the *Maximilianstrasse*; and a Festive Hall (1770) built to receive Marie Antoinette (q.v.) on her bridal journey to Paris. In the E. of the city is the Fuggerei, a settlement founded by the Fuggers in 1519 for needy citizens. **A.** is an important industrial city with textile, cash-register, Diesel engine, and other engineering manufs. Pop. 200,800.

Augsburg, Confession of, name of the formula, drafted by Luther and modified and revised by Melancthon, which contained the confession of faith presented by the Protestants to the Emperor Charles V at the diet of Augsburg in 1530. The original form was adhered to by the Ger. Reformed Churches. The document presented to the diet is preserved in the Austrian archives.

Augsburg, Interim of, name of a document which Charles V had drawn up by the theologians of both sides at a diet meeting at **A.** in 1548. He hoped by this to restore the unity of the Church, but though the Interim was accepted by the diet, neither Catholics nor Protestants would agree to it.

Augur. The Rom. college of **A.s** foretold events and interpreted the will of the gods from various signs and omens. Such were thunder and lightning, the flight and song of certain birds, the appetites of birds, particularly chickens, the movements and attitudes of beasts and reptiles, and incidents occurring at the moment when a magistrate performed some public act, or during an augural consultation. The answers of **A.s**, as well as the signs governing their utterances, were called *auguria*, *auspicia* being properly confined to divinations from birds. The political importance of the **A.s** was very great, as nothing of any

importance could be undertaken unless they were consulted, and they could postpone business at their pleasure. The number of the A.s. taken from the patrician class only till 307 BC, was 4 until 81 BC. In 81 BC the number was increased to 15, and Augustus appointed A.s as he pleased.

August, originally called Sextilis, 6th month in the pre-Julian calendar. It was named in honour of Augustus (q.v.), many of the most important events of whose life had occurred in that month. The first day of A. is called Lammass Day, and also the Gule of A. The A.-S.s called it *hlafmæsse*, loaf-mass, and it was the feast of thanksgiving for the first-fruits of corn.

Augusta, anct name of a number of tns named in honour of the Rom. Emperor Augustus, or one of his family. Three considerable tns at present are so called:

1. The cap. of Maine, U.S.A., and co. seat of Kennebec co., situated on the W. bank of Kennebec R., 45 m. from its mouth; a dam 17 ft high (built 1837) gives it considerable water power which is utilised in cotton, paper, and pulp mills. Other industries are shoemaking, printing, and the manuf. of wood products. A U.S. arsenal is here. Pop. 20,913.

2. The co. seat of Richmond co., Georgia, U.S.A., and the head of the steamboat navigation on the Savannah R. (212 m. upstream). It is a popular health resort, and is one of the largest cotton markets in the S. Its industries include iron-founding and sash, door, and blind manufs. Here are the univ. of Georgia, School of Medicine, Paine College, and the Haines Institute. The construction began in 1951 of the Atomic Energy Commission's huge Savannah R. plant. Pop. 71,508.

3. (or **Agosta**). Fort. seaport in Sicily (q.v.), 12 m. NNW. of Syracuse (q.v.). It is on the E. coast, on a small is. joined to the mainland by two bridges, and was founded by the Emperor Frederick II (q.v.), c. 1232, on the presumed site of the anct *Xiphonia*. In 1693 it was rebuilt following an earthquake. De Ruyter (q.v.), the Dutch admiral, was killed near here in 1676 during a naval action against the French. There are salt and fishing industries, and a trade in cheese, fruit, and agric. produce. Pop. 23,300.

Augusta Aescorum, see **ATCH**.

Augusta Emerita, see **MÉRIDA**.

Augusta Praetoria Salassorum, see **AOSTA**.

Augusta Suessionum, see **SOISSONS**.

Augusta Taurinorum, see **TURIN**.

Augusta Vindelicorum, see **AUGSBURG**.

Augustales: 1. Games held at Rome and in other parts of the empire in honour of Augustus. By a decree of the senate in 11 BC they were celebrated annually on the birthday (23 Sept.) of Augustus.

2. College of priests founded by Tiberius in order to attend to the worship of Augustus and the gens Julia. It was divided into 2 classes, one at Rome and the other in the municipia. The former class, 21 in number, was selected from the nobility of Rome, and was also augmented

by certain members of the imperial family. The latter class was usually composed of wealthy freedmen.

Augustan Age, term used to describe the flourishing state of Lat. literature under Augustus (q.v.). It is also used of the 'Classical' periods of literature in England under Queen Anne and in France under Louis XIV.

Augustenborg, small seaside tn on Als Is., Slesvig, Dan. since Austria's proposal in 1865 to make the Prince of A. ruler of Schleswig-Holstein was one of the ostensible causes of the Seven Weeks War (q.v.) between Austria and Prussia.

Augusti, Johann Christian Wilhelm (1772-1841), Ger. theologian of Jewish descent, educ. at Gotha and Jena; studied oriental languages and was prof. successively at Jena, Breslau, and Bonn. Later he became chief of the consistorial court at Koblenz. His most important writings deal with Christian archaeology and the exegesis of the O.T.

Augustine (Austin), St (354-430), b. Tagaste, in the prov. of Numidia. His father, Patricius, was a pagan; but his mother, Monica, instructed him in the Christian faith, and her son has given us a magnificent picture of her. As a boy he showed promise; and both his parents took considerable interest in his education, sending him to school at Tagaste and later at Madaura near by until he was 16. In spite of his mother, and at one time of his own desire, A. grew to manhood without baptism. Before he went up to the univ. at Carthage his father d., having at last become a Christian. At Carthage A. took a mistress, by whom he had a son, Adeodatus ('given by God'). This irregular union lasted some 14 years, and A. was always devoted to his son. He became greatly attached to the Lat. poets and writers, but he had so little Greek that it has been doubted whether he could read the original N.T. The *Hortensius* of Cicero gave him a desire for wisdom and showed him the folly of the life he had been leading. Manichaeism (q.v.), a so-called Higher Christianity, was the first philosophy that he embraced. He set up as a teacher of grammar in his native town, but soon returned to Carthage. His study of psychology quickly led him to doubt Manichaeism, and after a brief stay as a tutor in Carthage he set out for Rome, where he had a short illness, became disgusted with the mannerisms of the students, and left to become prof. of rhetoric at Milan. There he began his definite break with the Manichaeans, and for a time he fell under the influence of the Sceptics; but the oratory of St Ambrose, Bishop of Milan, and later his message, began to influence him. A. studied the Pauline epistles, and after a spiritual experience in the garden, which he has vividly described, retired into seclusion, announcing himself as a candidate for baptism. It was the summer of 386, and A. was in his thirty-third year.

He was baptised with his friend Alypius and his son Adeodatus. Soon afterwards his mother, who had rejoined him, d. at

Ostia. A. remained for some time in Rome, but in 388 he returned to his native tn. Here he began to form that rule of life which later developed into the monastic system of A., with a devoted band of followers. He was speedily invited to take a more active share in the work of the Church, but declined until c. 390. He went to Hippo to visit some Christian friends, and was invited to become priest there, later coadjutor to the bishop, and finally bishop of the see. Controversy played an important part in the work of St A. Not unnaturally, his first great attack was directed against Manichaeism, especially in his *Contra*



ST AUGUSTINE
A painting by Botticelli.

Faustum Manichaeum. His second great controversy was against the Donatists (q.v.). Their doctrines had been condemned by the Pope, as well as by the Emperor Constantine; but the party had made great progress, and A. vented his wrath in *The Seven Books on Baptism*. In these and later writings A. was led to make certain statements concerning the use of civil power to control separatism in the Church.

A.'s greatest controversy, however, was against Pelagianism (q.v.). It lasted for many years, and the heretical doctrines were refuted in no fewer than 15 treatises. In these we have the saint's theories of original sin, the need for infant baptism, and the relation of human to divine righteousness. They represent A.'s attempt to express the relations of the human and the divine. Among his greatest works are *De Civitate Dei* (The City of God), a vindication of the Church in face of a threatened collapse of the empire, and his *Confessions*. His *De Opere Monachorum* had great influence

on monastic work. The so-called Rule of St A. was never formally drawn up by him, but was culled from his writings on community life during the monastic revival of the 11th cent. A. d. during the siege of Hippo by the Vandals in 430, before the city surrendered. The Platonist outlook of A. has, since the Middle Ages, been somewhat uncongenial to a Catholic theological system dominated by the Aristotelianism of St Thomas Aquinas; but he had enormous influence on the Protestant reformers, who grossly exaggerated his pessimistic view of fallen human nature and his doctrine of predestination. Jansenism (q.v.) also derived its inspiration from him. He remains, nevertheless, for Rom. Catholics, as for Protestants, the greatest Father of the Lat. Church. See ed. by Pilkington and others, *Select Library of Nicene and Post Nicene Fathers* (vols. i-viii), 1887-92; a trans. of the works by M. Dods, 1871-8; the *Confessions*, trans. E. B. Pusey, 1838, and *The City of God*, trans. J. Healey, 1610 (both in Everyman's Library). See also E. Leigh-Bennett, *Handbook of Early Fathers*, 1920; M. I. Barry, *St Augustine the Orator*, 1924; W. J. S. Simpson, *St Augustine's Conversion*, 1930; E. Przywara, *An Augustine Synthesis*, 1936; S. C. M., *Library of Christian Classics*, 1956.

Augustine, St. first archbishop of Canterbury, was sent from Rome (where he was prior of St Andrew's on the Coelian) by Pope Gregory I to undertake the conversion of the English. AD 596. With 40 monks he landed in the isle of Thanet, and through the influence of Queen Bertha (already a Christian) was well received by King Ethelbert of Kent, who, however, would not at first receive the mission within doors for fear of magical arts. A. gradually won his confidence, and within a year or two Ethelbert and his people were converted. The chief seat of worship was at Canterbury, and the first regular services were held at the church of St Martin, a relic of Rom. Christianity. Other churches rapidly arose, and in 601 A. received from Gregory the pallium as Archbishop of Canterbury and primate of Britain. There was already a Christian community in the W. country, founded by the disciples of St Columba, their prin. church being at Bangor, on the Dee. These declined to acknowledge A.'s authority, and a conference held at A.'s Oak (somewhere near the Severn) failed to convince them; but only a few years later the settlement at Bangor was utterly destroyed by the pagan Ethelfrid. As an administrator A. seems to have been both firm and moderate. The date of his death is uncertain, but was probably between AD 604 and 610. His feast is on 26 May.

Augustine, St. *Canons of the Order of.* Until the Lateran Council in 1059, almost the only religious order in the W. church was the Benedictine. But the canons regular of St A., founded soon after and in consequence of the Lateran synod, made a new departure. Taking for their guidance the rule of St A. of

Hippo, written by him about the end of the fourth cent., they took religious vows and lived in communities, yet they were not monks, but clergy doing pastoral work. Their separate 'houses' soon began to draw together and organise themselves into 'congregations'; among the chief were those of the Lateran, Rome, of St Victor, Paris, and of the Gilbertines in England. These congregations spread all over W. Europe, and were very strong in England. At the dissolution of the greater monasteries by Henry VIII in 1539, no fewer than 60 of them were Augustinian. Only a few houses of canons regular still remain, but of late years there has been a revival of the order in England.

Augustodunum, see AUTUN.

Augustów (Russian Avgustov), tn of Poland, in Białystok prov., 50 m. N. of Białystok (q.v.). It is on the A. canal, which connects the Vistula with the Neman (q.v.). In 1915 (see WORLD WAR, FIRST) the S. wing of the Russian Army was here surrounded by the Germans and forced to surrender. There are cement, brick, and flour manufs. Pop. 15,000.

Augustulus, Romulus, last of the nominal emperors of Rome. He was placed on the throne by the soldiery in AD 475 at the instigation of his father Orestes, but in 476 the Herulian chief Odoacer raised a revolt, slew Orestes, deposed A., and proclaimed himself King of Italy.

Augustus, title borne by all the Rom. emperors from the time when it was conferred by the senate upon Gaius Julius Caesar Octavianus in recognition of his services to the state.

Gaius Octavius was b. at Rome on 23 Sept. 63 BC; his mother was niece of Julius Caesar. In early youth he lost his father, and spent the next years under the control of his stepfather, L. Marcius Philippus. In 44 BC he was studying at Apollonia in Illyria when he heard the news of Caesar's assassination. Urged by M. Vipsanius Agrippa (q.v.), he returned at once to Italy, where he learned of his adoption into the gens Julia (on which account he assumed the name Gaius Julius Caesar Octavianus) and of his appointment as Caesar's heir. His claims in this last respect were ignored by Antony (see ANTONIUS, MARCUS (MARK ANTONY)) and the republican leaders; but he found favour with the veteran troops of Caesar, and made gradual headway by using all competitors for power while helping none. The two triumvirates of 43 and 37, as well as the destruction of Brutus and Cassius at Philippi in 42, led by stages to the victory of Actium (31). Octavian now stood forth before his countrymen, exhausted by years of civil strife, as their deliverer and one hope of peace. He devoted the next 18 months to restoring order and regular constitutional gov.; but although he was in fact absolute master he carefully avoided all forms, titles, and honours suggestive of kingly power. His achievement was acknowledged by

the senate on 17 Jan. 27 BC, when he received from them the title of A. The next step was to reorganise the provs., both with regard to their administration and to their frontiers, a task which occupied him from the end of 27 until Oct., 19 BC. The years 18-17 were spent in domestic reforms, which were marked by the Secular Games in June of the latter year. From then until AD 10 A. was largely occupied with the problem of the succession and with that of securing the Rhine-Danube frontier. The latter was finally accomplished by the campaigns of Drusus and Tiberius (qq.v.), notwithstanding the disaster to Varus (q.v.) in AD 9. After many disappointments, the succession was finally settled upon Tiberius. A. d. at Nola in Campania on 19 Aug. AD 14, and was immediately numbered among the gods. Notwithstanding his earlier faults and crimes, his achievement entitles him to rank among the world's great men. By his first wife, Scribonia, whom he divorced in 39, he had a daughter (married successively to Agrippa and Tiberius). His second wife, Livia, bore him no children. See H. Hammond, *The Augustan Principate*, 1933; J. Buchan, *Augustus Caesar*, 1937; M. Grant, *From Imperium to Auctoritas*, 1946.

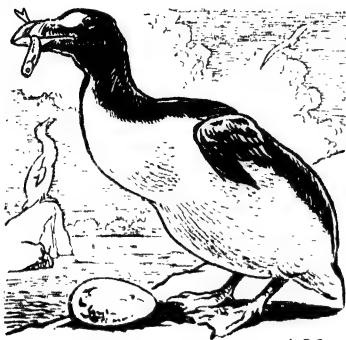
Augustus, name of 3 electors of Saxony; 2 of them were also kings of Poland.

Augustus I's (1536-86) chief title to fame was his adoption of the Calvinistic form of religion and his later conversion to Lutheranism. When he became a Lutheran he violently persecuted the Calvinists. To him is due the founding of the great library at Dresden.

Augustus II (1670-1733), elector of Saxony and King of Poland. After the death of Sobieski in 1697 he became a candidate for the kingdom of Poland, which he succeeded in obtaining owing to the lack of opposition from France, whose claimant was the prince of Conti. A. now changed the hereditary religion of his family and became a Catholic. In alliance with Russia he fought Sweden in a vain attempt to win back the provs. which Sweden had previously conquered, and also in an equally vain attempt to make his elective power as despotic as his power in his hereditary dominions. He was defeated, and in 1704 deposed, Stanislas Leszczynski being elected in his place. After the battle of Poltava he marched into Poland with an army and regained the crown, which he kept until his death in 1733. He attempted to make his elective crown of Poland hereditary. His court was the most immoral in Europe, and of his numerous children only one was legitimate.

Augustus III (1696-1763), only legitimate son of A. II, elector of Saxony and King of Poland. On his accession the war of the Polish Succession broke out. The candidates were A. and Stanislas Leszczynski, the deposed king. By the help of Russia A. drove Stanislas out and became sole king in 1734. During the war of the Austrian Succession he was first against Maria Theresa, but

ultimately on her side. He was defeated by Frederick the Great at the battle of Kesseldorf, and the treaty of Dresden was concluded. In 1756 he was driven from Saxony by Frederick the Great, whose raid found its own justification in the archives of Dresden. The treaty of Hubertsburg of 1763 restored Saxony to him. A. III d. in the same year.



GREAT AUK

Auk, family of oceanic birds, scientifically known as the Alcidae, belonging to the Charadriiformes, including the A.s., the razor-bills, the guillemots (*Uria*), and the puffins (*Fratercula*). They have short wings, webbed feet, heavy bodies; they feed on fish, and lay their solitary egg on a rock. *Alca impennis*, the great A., formerly common in Spitsbergen, has been extinct since 1844; *Alca torda*, the razor-bill, most common in Labrador, is killed for its breast-feathers; *Fratercula arctica*, the puffin, is seen round the Brit. coast; *Uria aalge*, the guillemot, is common around the Brit. coasts. The great A. could not fly, but other A.s. use their wings for short-distance flights and also as oars in the sea. See GARE-FOWL.

Auk, Black-billed, see RAZORBILL.

Auk, Little, see ROTCHE.

Aula (Lat., from *Gk. aulê*): 1. Large room in a Gk or Rom. house.

2. The assembly hall in a Ger. univ.

Aula Regis, see CURIA REGIS.

Aulacodus (Gk *aulax*, furrow; *odus*, tooth), genus of rodents of the family Octodontidae, found in S. Africa. It is a ground-rat, about the size of a cat, and is related to the porcupine and guinea-pig.

Aulanko, near Hämeenlinna, Finland, magnificent park containing a modern hotel. Centre of tourism throughout the year.

Aulic Council, legislative and executive body, estab. by the Emperor Maximilian I in 1497, to assist in governing the Holy Rom. Empire. At first its business was very wide, including every question, home or foreign, which might come before the emperor. Its exact powers were defined in the treaty of Westphalia, and

subsequently it functioned principally as a judicial court.

Aulie Alta, see DEZHNEBAL.

Aulls, anct Boeotian seaport on the Euripus, famous as the starting place of the Gk fleet for the Trojan war, also as the scene of the sacrifice of Iphigenia.

Aullagas, see POORO (Lake).

Aulnoy, Marie Catherine, Baronne d' (1650-1705), Fr. authoress. She wrote sev. romances now forgotten, and some lively but untrustworthy memoirs, but her *Contes de fées* (6 vols., 1698), among which may be mentioned 'The Blue Bird' and 'The Yellow Dwarf', have had a lasting success. She conspired against her husband, bringing a false accusation of treason; being detected she fled to Spain, but after some years was allowed to return in reward for secret services rendered to the gov. of Louis XIV.

Aulophyte, plant, not a parasite, that shelters within another.

Aulus Gellius (c. 123-c. 165), Lat. grammarian, b. in Africa. At the age of 16 he came to Rome to study, and among his tutors were Apollinaris and Fronto. His work, entitled *Noctes Atticae*, is a dialogue in which the most varied questions of grammar, philosophy, hist., and archaeology are discussed. It derives its title from the fact that it was composed at Athens and was written during the winter nights. Although the author's style is by no means free from affectations and obscurity, and the work as a whole is most pedantic in tone, it is nevertheless very valuable from the great number of literary quotations and references to personages and customs which are found therein. There is an ed. with trans. by J. C. Rolfe (Loeb Library, 1927-8).

Aumale: 1. Fr. tn in the dept of Seine-Inférieure, on the R. Bresle. It has textile and iron works. Some work in the church is attributed to Jean Goujon. Formerly called Albemarle or Aumerle. Pop. 2200.

2. Fr. military station in Algeria, on the site of an old Rom. settlement, about 80 m. from Algiers.

Aumale, Counts and Dukes of. The co. of A. in Normandy was granted by William the Conqueror to his brother-in-law, Odo of Champagne. Havoise, Countess of A. in her own right, married firstly Wm de Mandeville, Earl of Essex (d. 1189), secondly Wm de Fors (d. 1195), and thirdly Baldwin de Behen (d. 1214). On the death of Baldwin, Count of A. by right of his wife, the co. was claimed by Wm de Fors, son of Havoise by her second marriage, and was confirmed in his possession by King John. But Normandy had in the meantime been conquered by Philip Augustus, and A. was taken by the Fr. Crown. The title of Earl of A. (subsequently Earl of Albemarle) was retained by Wm de Fors. A. was conferred on the son of Philip Augustus. After passing through many hands it came into the possession of Louis XIV, who gave it to the Duke of Maine, and subsequently it came into the hands of the Dukes of Orleans. The title of Duke of A. has

been borne by the sons of dukes of Orleans since the reign of Louis Philippe.

Aumale, Charles de Lorraine, Duc d' (c. 1554-1631), Fr. courtier, a fanatical supporter of the Guises during the religious wars in France. A leader of the league and, together with the Duke of Mayenne, leader of the Catholics on the death of Henry of Guise. After being decisively defeated by Henry IV he went over to the Spaniards, and betrayed sev. places into their hands. He was later sentenced to death but escaped. A. d. in exile in Brussels.

Aumale, Henri Eugène Philippe d'Orléans, Duc d' (1822-97), son of Louis Philippe, King of France. He served with distinction in the Fr. army, and in 1879 became inspector-general of the army. In 1886 he was exiled from France, but the decree was later revoked.

Aumbry (Lat. *armarium*; Fr. *armoire*), cupboard or niche in a wall of a church. It is sometimes written in the form almyry, being confused with almonry and taken to mean a place for alms. This word is usually applied to a locker in churches wherein were placed sacramental vessels, vestments, etc. In its corrupt usage the word was formerly applied to the almonry of Westminster Abbey. See G. Dix, *A Detection of Lumbries*, 1942.

Aumonier, Stacy (1887-1928), novelist, educ. at Cranleigh. Son of a sculptor, he began his career as a landscape painter, but turned to writing in 1913. He served as a private in the First World War, and his best novel, *The Querrils*, tells of a war-time family. As a writer of short stories he was still more successful. Among his books are *Heartbeat*, 1922, *Overheard: Fifteen Tales*, 1924, *The Baby Grand*, 1926, and *Little Windows*, 1931.

Auncel, kind of balance or steelyard formerly used in England. It had a movable fulcrum and fixed weight, and the finger was often used as the fulcrum, which gave great opportunity for cheating.

Aune, or **Aulne**, old European cloth measure (Lat. *ulna*, elbow). It roughly corresponded to the Eng. ell. It is still used in Switzerland where it measures 47½ in.

Aungerville, Richard (1281-1345), bishop, statesman, and author, b. near Bury St Edmunds, and often known as Richard de Bury. Educ. at Oxford, he became tutor to Prince Edward, on whose accession as Edward III he obtained rapid advancement, being sent sev. times on embassies to the pope (then at Avignon) and the Fr. court. In 1333 he became bishop of Durham, next treasurer, and then chancellor of the realm. He is best known to posterity as an ardent book-lover and collector; his authorship of *Philobiblon* is, however, disputed.

Aunis, anct. prov. of France, corresponding to parts of the present depts of Charente-Maritime and Deux-Sèvres. It was united to the Fr. crown in 1271 after having been the property of the Plantagenets (q.v.), and was again in Eng. hands from 1360 to 1373. The cap. was La Rochelle (q.v.).

Aura, in medicine, term applied to the sensation which precedes an epileptic fit (see EPILEPSY). Not all epileptics have an A. preceding their fits, but many do and with experience come to recognise its significance. A.s may be in the form of any kind of sensation from a feeling of heat or cold in the extremities to that of a distinctive smell or a particular sort of noise. As a rule an A. remains true to type in each person.

Aural Diseases, see EAR.

Aurangabad, walled tn in Hyderabad State, India, 67 m. NE. by N. of Ahmednagar. It has the ruins of a palace built by Aurangzebe. It is the most convenient centre for visits to the famous caves of Ajanta and Ellora (qq.v.).

Aurangzeb (1618-1707), third son of Shah Jehan, a Mogul emperor of Hindustan. At an early age he showed great military talent, and was entrusted by his father with the command of sev. expeditions. Shah Jehan being taken seriously ill, his eldest son, Dara, seized the throne, but by a series of crafty negotiations and manœuvres A. made himself master, shut up Shah Jehan in prison, slaughtered his brothers, and so became sole ruler. His reign of 49 years (1658-1707) was a brilliant period of the Mogul dynasty, but his despotic gov., and especially his Mohammedan bigotry, excited intense opposition, and the latter part of his reign was greatly troubled by the princes of Rajputana and the Mahrattas under Sivaji.

Aurantes, see ABRANTES.

Auray, tn in the dept of Morbihan, France, 3 m. up the R. Auray. Famous for the ann. pilgrimage to its chapel of St Anne, called Le Pardon d'A. It has an agric. market, and important oyster beds. Fishing and boat-building are also carried on. Pop. 8600.

Aure, valley in France, in the dept of Hautes-Pyrénées, considered to be one of the most beautiful in the Pyrenees (q.v.). The chief tn is Arreau.

Aureliacum, see AURILLAC.

Aurelian Wall, fortified wall surrounding anct Rome, begun by the Emperor Aurelian (q.v.) in AD 271 and completed by Probus in 280. Its circuit of about 13 m. can still be traced, and much is in an excellent state of preservation. The wall had an average height of 50-60 ft and a width of 12 ft. It was constructed of concrete, with brick facing, with square towers at intervals of 45 ft, and was pierced by 14 gates.

Aurelian Way, anct Rom. road of uncertain date. It ran from the Janiculum gate at Rome northwards to Cosa, but was later extended to Vada Volaterrana. By the construction of the Via Aemilia in 109 BC it was carried to Gensu, Dortona, and (later still) to Arelatum (Arles).

Aurelianus, Caelius, see CAELIUS AURELIANUS.

Aurelianus, Lucius Domitius, Rom. emperor (AD 270-5), b. c. AD 213 of humble parents at Sirnium in Pannonia. After a distinguished military career he was proclaimed by the army as successor to Claudius II (q.v.). Having secured the

Danube and Rhine by driving the Goths from Moesia and by defeating the Alemanni and other Ger. tribes, A. completed his re-unification of the empire by crushing two pretenders to the throne—Firmus in Egypt and Tetricus in Gaul. Next (271) he went E. to quell the revolt of Zenobia (q.v.), Queen of Palmyra, and 3 years later celebrated a magnificent triumph at Rome. Late in 274 A. set out on an expedition against the Persians, but was murdered in Thrace by some of his own officers, at the instigation of a dishonest secretary. A. began the Aurelian Wall (q.v.).

Aurelius, Marcus Antoninus, see **MARCUS AURELIUS**.

Aurelius Victor, Sextus (4th cent. AD), Rom. historian, a favourite of Constantius II. He wrote hist. of Rome before and after Augustus. His work was continued in the next cent. by another writer using the same name.

Aureole, shining cloud surrounding the representation of sacred personages in Christian art. Originally confined to divine figures only, but afterwards more widely used. The A. surrounds the whole figure; a luminous ring round the head only is called a nimbus; the A. is also found in anct pagan art, and is probably of mythological origin.

Aureomycin, see **ANTIBIOTICS**.

Aures Mountains, S. Algeria, one of the Atlas ranges; highest peak, Sheliya, 7760 ft. The dist. was under Rom. rule, and its people, mostly Berbers, are of very mixed descent, showing frequent traces of fair, probably Gaulish or Vandal, ancestry. The A. M. were occupied in 1845 by the French, whose chief settlement, Istata, is near the great Rom. ruins of Lambaesis.

Aureus. The atater A. of anct Greece equalled 25 Attic drachmas of silver, about £1 Eng. The first Rom. A., of pure gold, was struck about the close of the war with Hannibal, and was copied from Gk models. It was worth about 16s. Eng. It did not become a standard coin until the time of Julius Caesar. Later emperors reduced its value.

Aureus, Mons, see **JANICULUM**.

Aurice, Georges (1899–), Fr. composer, b. Lodève (Hérault). He studied both at the Conservatoire and the Schola Cantorum in Paris. Under the influence of Satie he was one of those who formed the group of 'Les Six.' His first success was incidental music for Molière's *Les Fâcheux* (1923), which he turned into a ballet, the first of more than a dozen. After his music for René Clair's film *A nous la liberté* (1932) he was much in demand by both Fr. and Eng. film studios. He has also written a few choral, orchestral, and chamber works, and numerous piano pieces and songs.

Aurich, Ger. tn in the Land of Lower Saxony (q.v.), on the Ems-Jade canal, 117 m. NW. of Hanover (q.v.). Until 1744 it was the seat of the rulers of E. Friesland; the dist. then passed to Prussia (q.v.). There are brewing and paper industries. Pop. 11,000.

Aurichalcite (Lat. *aurum*, gold; Gk

chalkos, copper), amorphous, green, transparent mineral formed of hydrocarbonate of copper.

Auricle: 1. The external ear; its cartilaginous structure acts as a collector of sound. See **EAR**.

2. One of the two upper cavities of the heart. See **HEART**.

Auricle, in botany, small ear-like projections at base of leaves; hence aurioled or auriculate—having ear-like appendages; e.g. grasses.

Auricula (Lat. dimin. of *auris*, ear), genus of univalve-shelled molluscs, which inhabit marshes and their borders. The animals are snails of the Pulmonata and family Auriculidae; they are found in the warmer climates, where they feed on plants. Fossil Auriculæ are found in the Jurassic system, and the shells are long and spiral. *A. midæ*, or Midas's ear, is found in the E. Indies.

Auricula (*Primula auricula*), plant of the family Primulaceæ. It grows abundantly on the Swiss Alps, and has many florists' varieties.

Auriga (Lat. 'the Charioteer'), constellation situated between Perseus and Gemini. It is represented as a man holding a bridle in his right hand and supporting a goat and kids on the left arm. Alpha Aurigæ, in the body of the goat, called Capella (and Alioth by the Arabs), is brighter than the first magnitude, and by it the constellation is most easily found. The neighbouring constellation is Perseus; around it are Taurus and Gemini; and the prin. stars are never below the horizon in the Brit. Isles. The mythology of the figure is uncertain, being attributed by some to the Hærus of the Egyptians, whilst others accord it a Euphratean origin. Capella is the fifth brightest star in the heavens, its magnitude being 0.2, and it has a companion, magnitude 9, at a distance of 158". Its proper motion has been calculated as 44" a cent. In 1900 Prof. Campbell at the Lick Observatory, and Prof. Nowell at Cambridge, found that Capella is a spectroscopic double, the 2 stars revolving about their common centre of gravity in a period of 104 days. A new star, Nova Aurigæ, discovered with the naked eye by Dr Anderson in 1891, then of a magnitude 4.4 and still visible to powerful telescopes, is one from which we have learned much about the various *novæ*, or new stars.

Aurigny, O.F. name for Alderney (q.v.), used by Macaulay in his poem on the Armada.

Aurillac (anct *Aureliacum*), Fr. tn, cap. of the dept of Cantal, on the Jordanne. It had once a great monastic school, and there are many fine, anct buildings and monuments in the tn. Pope Silvester II (q.v.) was b. here. There is a market for livestock, and cheese, umbrellas, and paper are manuf. Pop. 22,000.

Auriol, Vincent (1884–), Fr. statesman, educ. at Paris Univ. A Socialist deputy from 1914, he held office in the Blum and Chautemps govts. before the Second World War. He opposed the decision to surrender to Germany in 1940. Was interned, but escaped to London in

1943. He was president of the constituent assembly in 1946, and in Dec. became president of the national assembly. From 1947 to 1953 A. was the first president of the Fourth Rep. It was a period of considerable political instability in France, and A.'s non-partisan statesmanship played a large part in ensuring continuity of gov. and internal calm despite constant political crises.

Aurispia, Giovanni (c. 1370-1459), It. scholar, patronised by Cosmo de' Medici and Pope Eugenius IV. He visited Constantinople and brought away valuable MSS.

Aurlandsfjord, branch of the Sogne Fjord (q.v.), on W. coast of Norway, being a winding inlet running to the S. of the main fjord.

Aurochs (*Bos primigenius*), anct wild ox of Europe, and a descendant of the gigantic cattle of the Pleistocene period. It was known up to the 16th cent., but is now extinct.

Aurora (Gk *ēōs*), Rom. goddess of the dawn.

Aurora, city in Illinois, U.S.A., on Fox R., 36 m. W. of Chicago, in a dairying and stock-raising area. A. has railway and machine shops, and manufs. aluminium goods and machinery. Pop. 50,600.

Aurora Borealis, see LIGHTS, NORTHERN.

Aurangzeb, see AURANGZEB.

Ausable Chasm, deep gorge, 2 m. long, near Ausable R., New York, noted for its beautiful scenery.

Auschwitz (Oświęcim). The Ger. commandant of the A. concentration camp, Hoess, was tried and executed in Warsaw in 1947 for the murder of 4,000,000 persons in this admittedly the worst of all Ger. death-camps. A. was built in 1941. The figure Hoess gave for those executed by gas was 1,500,000, all Jews, but he admitted under cross-examination that on one night alone train-loads of Jews and gipsies were taken on arrival and thrown into an immense pit and there burnt alive. Witnesses said the number so put to death was 40,000. Such evidence of horrors continued to be given at the trial day by day. The public prosecutor emphasised that at A. executions and torture were carried out on a scale which made it plain that the Nazi aim was total destruction of the Jewish race and total subjugation of the Slavs.

Ausculum, see ASCOLI DI SATHIANO.

Ausgleich, name of a treaty which governed the fiscal, financial, and commercial relations between Austria and Hungary, first concluded in 1867, and renewed in 1878, 1887, 1902, and 1907. Its chief functions were the regulation of the amount contributed by each towards the imperial exchequer, and the proportional div. of the national debt.

Ausonians, name by which Virgil in the *Aeneid* designates the Italians as though they were named after Auson, son of Ulysses. It is also used by Milton.

Ausonius, Decimus Magnus (c. 310-c. 395), Lat. poet, son of a physician of Burdigala (Bordeaux), where he received his education. He first became an advocate, but afterwards a prof. of

grammar and rhetoric. He was so successful that the Emperor Valentinian invited him to Rome to be the tutor of his son Gratian. When the latter came to the throne he bestowed high rewards on his teacher, giving him the prefectures of Gaul and Italy, and afterwards (379) the consulship. At the death of Gratian, 383, A. retired to Burdigala. His contemporary reputation seems hardly justified by his surviving works; he was rather a verse-maker than a poet, and his writings are marred by licentiousness. See the ed. with trans. by H. G. Evelyn-White (Loeb Library, 2 vols., 1919-21).

Auspices, see AUGUR.

Aussee, Bad, Austrian spa in the prov. of Styria, on the Traun. It is in the Salzkammergut (q.v.), and has a 15th-cent. church. There are saline springs and salt mines. Pop. 5700.

Aussig, see ÚSTÍ NAD LABEM.

Aust-Agder, S. co. of Norway, bordering the Skagerrak. Area 3606 sq. m.; pop. 75,800.

Aust Cliff, famous Rhaetic bone-bed in Gloucestershire. The bed is exposed on the bank of the Severn at this locality.

Austen, Charles John (1779-1852), younger brother of Jane A., Brit. rear-admiral (1844). Assisted in the capture of the *Komet*, the *Tribune*, the *Ville de l'Orient*, and the *Scipion*; was wrecked in the *Phoenix* (1816); commanded the *Aurora* in the W. Indies (1826-8), being engaged in suppressing the slave trade; assisted at the bombardment of St Jean d'Acre (1840).

Austen, Sir Francis William (1774-1865), elder brother of Jane A., the novelist, entered the Royal Naval Academy in 1786. Two years later he joined the *Perseverance* brig, thus commencing a long and honourable career. During the great Fr. war he was in constant service, attained post rank in 1801, and was flag-captain on the *Canopus* in 1805. In 1809, for distinguished service in the E. Indies, he was presented by the E. India Co. with £1000. From 1810 to 1814 he served chiefly in the N. Sea and Baltic. Was made K.C.B. in 1837, and admiral of the fleet in 1863.

Austen, Jane (1775-1817), novelist, b. Steventon, Hants, daughter of a clergyman who had been a Fellow of St John's College, Oxford. In 1784 she was sent to a school at Reading, along with her elder sister Cassandra, who was her lifelong friend and confidante, but for the most part she was taught by her father, and thus had a far better education than fell to the lot of the average Eng. girl of her class. She began writing at an early age, *Love and Friendship* [sic] dating from her teens. In 1801 the family moved to Bath, the scene of so many episodes in her books, and, after the death of her father in 1805, to Southampton and then to Chawton, a vil. in Hants where the house in which most of her novels were written is still standing. Apart from occasional journeys to London and holidays at Dawlish, Teignmouth, or Lyme Regis, her life was placid and uneventful. In May 1817 the family moved to Winchester so

that she might have skilled medical attention for the consumption from which she was then suffering, but in spite of every care she d. 2 months later and lies buried in Winchester Cathedral. The chronology of her 6 novels is complicated by the fact that the order of pub. is so different from the order of composition. *Pride and Prejudice*, considered by many critics the best, was begun in 1796, the original title being *First Impressions*; offered to a publisher in the following year, it was rejected, and only appeared at last, after revision, in 1813. *Sense and Sensibility* was pub. 2 years earlier, though it had not been begun till 1797, having been originally planned with the title *Elinor and Marianne. Northanger Abbey*, that satire on the 'horror tales' of the time, also begun in 1797, was sold in 1803 to a publisher who made no use of it; in 1816 the MS. was recovered, but it was not pub. till after the writer's death. The hist. of the remaining 3 novels is more straightforward. *Mansfield Park*, begun in 1811, was pub. in 1814; *Emma*, written in 1815, appeared in 1816, the year after *Persuasion*, the last of the novels, was written, to be pub. posthumously. *Sanditon*, a fragment written in the year of her death, was first pub. in 1925. J. A.'s novels, like her life, are uneventful. Though pub. in the 19th cent. they really belong to the 18th, for there is little passion or romantic atmosphere in any of them. She lived right through the Napoleonic wars, yet no reference is made to the events of the time, even though naval officers (2 of her brothers rose to be admirals) figure so frequently in her pages. But in her own limited sphere, depicting the actions and describing the society of Eng. country families, she is unsurpassed. She herself spoke of 'the little bit (2 in. wide) of ivory on which I work with so fine a brush as produces little effect after much labour.' Her genius was at once recognised by such critics as Coleridge, Southey, and Macaulay; and Walter Scott declared 'she had a talent for describing the involvements and feelings and characters of ordinary life which is to me the most wonderful I ever met with.'

The standard ed. of her works is that of R. W. Chapman, 1923, who also ed. 3 vols. of juvenilia and fragments, 1922-51, and her letters, 1932. See J. E. Austen-Leigh, *A Memoir of Jane Austen*, 1871; C. Hill, *Jane Austen, her Homes and her Friends*, 1901; G. E. Mitton, *Jane Austen and her Times*, 1905; F. W. Cornish, *Jane Austen*, 1913; R. Brimley Johnson, *Jane Austen*, 1930; David Cecil, *Jane Austen*, 1935; M. M. Lascelles, *Jane Austen and her Art*, 1939; R. W. Chapman, *Jane Austen, Facts and Problems*, 1948; C. Austen, *My Aunt Jane Austen*, 1952; M. L. Becker, *Presenting Miss Jane Austen*, 1952.

Auster, in Rom. literature, the S. or SW. wind; referred to by Virgil in his second eclogue, l. 58.

Austerlitz, see SLAVKOV.

Austin, St., see AUGUSTINE, ST.

Austin, Alfred (1835-1913), Poet Laureate, b. Leeds, son of a merchant. He was educ. at Stonyhurst, Oscott, and London

Univ., graduating in 1853. He became a barrister in 1857, but within a few years turned to literature, making his first success in 1861 with a lively satirical poem, *The Season*; this being strongly attacked, he retorted with another satire on his assailants. He pub. many works in prose and verse, including tragedies, lyrics, poems on historical persons and events, and, above all, poetry and prose descriptive of nature, the latter subject being perhaps most congenial to his muse. One of his best-known books is *The Garden that I Love*, 1894, a prose idyll. A. had a considerable place in journalism, as a leader-writer and correspondent, and was for some years editor of the *National Review*. At the death of Tennyson in 1892 everyone recognised that the 2 greatest surviving poets were both unsuitable for the laureateship; and the selection, which aroused much controversy, was left in abeyance until 1896, when A. was appointed. See his autobiography, 1911, and Norton B. Crowell's *Alfred Austin, Victorian*, 1953.

Austin, Herbert, 1st Baron Austin (1860-1941), motor-car manufacturer, b. Little Missenden, Bucks, educ. at Rotherham Grammar School and Brompton College. In 1882 he went to Melbourne where he served his engineering apprenticeship, and later joined Wolseley who was developing a sheep-shearing machine. Having returned to England in 1893 he became manager of the Wolseley Tool and Motor-car Co. in 1901, and in 1905 he founded his own A. Motor Co. He was elevated to the peerage in 1936. His major achievement was the development of the famous 'Austin Seven', an extremely efficient, cheap, light, and economic small car with an amazingly long life—cars of the 1924 model are frequently seen on the roads to-day. The A. Motor Co. merged with Morris Motors to form the Brit. Motor Corporation on 28 Feb. 1952, as a holding company with a share cap. of £5,000,000, controlling 42,000 workers and with an ann. output of 400,000 vehicles.

Austin, Horatio Thomas (1801-65), Eng. navigator and explorer, served under Parry in 1824 in his fruitless attempt to find the NW. Passage. He distinguished himself in the Egyptian expedition of 1840. From 1850 to 1851 he commanded an expedition sent in search of Franklin, in the *Resolute*, *Assistance*, *Pioneer*, and *Intrepid*, to the Canadian Arctic.

Austin, John (1790-1859), writer and authority on jurisprudence; after a short career in the army, during part of which he served in Sicily, he was called to the Bar in 1818. His success as a barrister was indifferent, and in 1825, his health giving way, he retired from legal practice. In 1826 he was appointed prof. of jurisprudence in the newly founded univ. of London. The success of his lectures was not maintained, and in 1832 lack of students induced A. to resign the chair. In 1833 he was appointed a member of the commission on the reform of the criminal law, and in 1836 a member of the Maltese commission. A.'s lectures and writings

on jurisprudence are distinguished by originality and power of expression, and have exercised great influence in modern conceptions of the subject. The philosophical value of his work has been disputed, but in his *Province of Jurisprudence Determined*, pub. in 1832, and treating of the relation between law and ethics, his doctrine of utilitarianism is admirably presented. His *Lectures on Jurisprudence or The Philosophy of Positive Law* was ed. and pub. after his death by his wife, Mrs Sarah A. (q.v.). His collected writings have been pub. under the editorship of his son-in-law, Mr Robert Campbell, and in this form have gone through sev. eds. See Preface by his wife to *The Province of Jurisprudence*, 1861, and the interesting account by John Stuart Mill in his *Dissertations*.

Austin, Sarah (1793-1867), wife of John A., pub. sev. trans. from the French and German, including Guizot's *English Revolution*, 1850, and Ranke's *Popes*, 1850, and *History of the Reformation in Germany*. She was also the author of *Germany from 1760 to 1814*, 1854, and *Letters on Girls' Schools and on the Training of Working Women*, 1857.

Austin, Stephen Fuller (1790-1836), founder of the rep. of Texas, was the son of one of the early settlers in the dist. In 1822 he planted the first Anglo-Amer. settlement, on the Brazos. In 1834, in consequence of his attempts to secure the recognition of Texas as a separate state of the Mexican Rep., he was imprisoned for some months in Mexico City.

Austin: 1. Cap. of Texas, U.S.A., on the Colorado R. and co. seat of Travis co. It was first built and named Waterloo by Amer. settlers in 1838, the Texans having won their independence from Mexico 2 years earlier. It was renamed A. in honour of one of their leaders in 1839 when they made it their cap. It is now a city with considerable trade and manufs., a fine capitol, and a univ. Pop. 132,000.

2. City, cap. of Mower co., Minnesota, U.S.A., in agric. area 35 m. SW. of Rochester near Iowa state line, with railway repair shops. It manufs. food products. Pop. 23,100.

Austin Friars, name of a well-known monastery of the Augustinian order, at one time situated in Broad Street, London. It was founded in 1253 by the Earl of Hereford.

Austral Islands, in the SE. Pacific, are part of Fr. Oceania. They include 5 inhabited and 2 uninhabited is., extending over a distance of 800 m., about 300 m. S. of Tahiti. The inhabited is. are Iturutu, Tubuai, Rimatara, Raiavavae, and Rapa; the uninhabited are known as the Bass Rocks (or Marotiri) and Iuili (or Marla) Is. Total area 63 sq. m.; pop. (1951) 3983. Though volcanic in origin, none of the is. rises to great height. They are fertile, well wooded, and well watered. The natives are handsome and independent; they build and operate their own schooners. Exports include arrowroot, native hats and mats, copra, coffee, oranges, and livestock. No persons, other than natives, may visit Iturutu or Rimatara, the object

of this edict, issued in 1938, being to keep these Polynesian people unspoiled.

Australasia (S. Asia). This term is sometimes used as the equivalent of Oceania, and as such indicates Australia with the neighbouring is.—Tasmania, New Zealand, New Guinea, the New Hebrides, New Caledonia—the Malay Archipelago, the Philippines, and the other is. of the Pacific. Geographically it is most frequently used to denote Australia with Tasmania, New Guinea, New Zealand, New Caledonia, and the Solomon, Bismarck, and New Hebrides groups. It is also popularly used to signify the Brit. Australian possessions.

Australia, continent lying wholly in the S. hemisphere. Its position is between 10° 4' and 39° 8' S., and between 113° 8' and 153° 39' E. Its dimensions are 2400 m. from E. to W., and 1971 m. from N. to S. Approximately the area is 2,974,581 sq. m. Its nearest distance to England is about 11,000 m. Its coastline is 8850 m.

Physical. The whole continent of A. is, roughly speaking, a vast, irregular, and undulating plateau, part of which is below sea level, bounded on the E. by the Great Dividing Range and elsewhere largely by low sandy shores. The noticeable features of the continent of A. are: (1) its comparatively smooth outline; (2) its poverty of water communication with the interior; (3) the absence of active volcanoes and snow-topped mts; and (4) its antiquity. In the question of age, A. is claimed to be one of the oldest existing land masses. Its boundaries are, on the N., the Timor Sea, the Arafura Sea, and Torres Strait; on the E. the Pacific Ocean; on the S. the Bass Strait and the S. Ocean; and on the W. the Indian Ocean. The land surface stands at the top of a series of 3 terraces which rise from the ocean bed. In the Pacific the base of these foundations lies at a depth of 15,000 ft below the sea level. The next layer has a depth of 8000 ft. Where this terrace approaches the coast it becomes a continental shelf, and by it are connected A., New Guinea, and Tasmania. The Great Barrier Reef (q.v.) forms the edge of this shelf as it rounds the Queensland coast. Compared with other continents A. attains a mean altitude lower than them all. Generally the whole continent may be called a plateau whose interior is depressed and barren. The E. half of the continent is occupied by a plain 500,000 sq. m. in extent.

The Australian coasts are singularly free from inlets of the sea, save for the N. coast where the Gulf of Carpentaria forms the chief bay of the entire coast. Tasmania is the only important is. belonging to A.; those of New Guinea, Timor, etc., belong to other systems. There are numerous small is. off the coast, one of the largest being Kangaroo Is. at the entrance of St. Vincent's Gulf, but these are relatively unimportant. The mts of A. may be classed into 3 groups: (1) the E. Cordillera running parallel to the E. shore, (2) the central mts, comprising sev. ranges in S. A. and N. Ter., and (3) those of the

W., close to the shore. The highest point of the continent is Mt Kosciuszko, 7327 ft, in the Australian Alps, New S. Wales. Others which are also prominent are Mt Townshend, 7266 ft, and Mt Twynam, 7200 ft, also in New S. Wales, and Mt Bogong, 6508 ft, and Mt Feathertop, 6303 ft, in Victoria.

It is only within recent times, geologically speaking, that volcanic absence has been a characteristic of A. On some of the mts in W. Victoria the cones are quite intact and beds of scoriac have not yet been affected by denudation. Towards the Tertiary age large beds of lava were poured from sev. points of the Great Dividing Range, and it is worthy of note that volcanic action was confined to a wide region parallel to the coast.

The coastal region, save for the country round the Bight and Spencer Gulf, is well watered. On the E. coast are many large rvs. flowing into the Pacific Ocean, but the majority have short and rapid courses. Of the Queensland rvs., the finest is the Burdekin. It drains an area of 53,500 sq. m. and empties itself into Upstart Bay. Second in size is the Fitzroy, flowing into Keppel Bay. There are sev. important rvs. in New S. Wales, of which the largest is the Hunter, whose course is 200 m. The Murray, c. 1600 m. is the prin. riv. of A.; it passes through Lake Alexandrina, thence into the sea at Encounter Bay, in S. A.; its chief tribs. are the Murrumbidgee, Lachlan, and Darling. The prin. rvs. in the W. are the Swan, Murchison, Gascoyne, Ashburton, Fortescue, and the Fitzroy. There are sev. navigable rvs. in the N. Ter.: the Victoria, the Fitzmaurice, Daly, Adelaide, and Roper. Sev. large rvs., subtropical in character, drain the country around the Gulf of Carpentaria. The Darling is navigable for small steamers in times of freshets as far as Walgett, 1758 m. above its junction with the Murray. For further detail see NEW SOUTH WALES; NORTHERN TERRITORY; QUEENSLAND; SOUTH AUSTRALIA; TASMANIA; VICTORIA; WESTERN AUSTRALIA.

The lake region is a noteworthy feature of the interior. The extent of the lakes varies with the advent of the rains. The largest, Lake Eyre and Lake Torrens, are over 100 m. in length during a flood. During dry seasons their water is brackish and they are little more than salt-encrusted marshes.

Central A. is prolific in its store of subterranean water. Artesian wells have been sunk thousands of feet and much use has been made of this water, particularly in Queensland and New S. Wales. The water is forced to the surface by hydrostatic pressure of accumulated water at a higher level.

The climate of A. varies less than might be expected from its great size. Its distance from the Antarctic circle and from the equator, and, in the great plains, the enormous absorption of heat by day causing its radiation by night, form powerful factors in determining the uniformity of the climatic conditions. Two-fifths of A. receives less than 10 in. of rain

throughout the year, but the rest of the continent may be said to enjoy a fairly good supply. The NW. coast is subject to tropical downpour from Dec. to Mar., while the remaining coasts enjoy a mean rainfall of 50 in. in the E., and much less in the S., on an average 24 in., while part of the S. and W. coasts attains only 10 in. to 20 in. The rainfall throughout most of the country is uncertain, and not infrequently droughts have caused heavy losses to settlers, while, when the season breaks, almost as much destruction has been caused by floods. Much has been



Australian Government

RIBBON OR MANNA GUM (*E. viminalis*)

The ribbons of bark that hang from the trunks are often 15–20 ft long.

done to alleviate this problem by irrigation, especially in the Murray basin, where dams, rvs., locks, and weirs have been constructed. The scarcity of natural water has been mitigated to some extent by borings. The huge Hume reservoir on the Murray near Albury has an area 2½ times that of Sydney harbour and a capacity of 2,500,000 ac.-ft of water; the Snowy R. diversion through the Alps into the Murray and Murrumbidgee will eventually supply an additional 2,000,000 ac.-ft of water a year for irrigation, 5 times the existing amount available.

Geologically, A. seems to consist chiefly of Palaeozoic and Cainozoic or Tertiary formations, though Mesozoic or Secondary deposits have been revealed. The Grampians, Pyrenees, Great Dividing Range, Australian Alps in Victoria, the Blue Mts in New S. Wales, the Dividing Range in Queensland, consist chiefly of Silurian strata interrupted here and there by

granite, syenite, etc. This Silurian character also dominates S. A.; a large area to the S. and W. of W. A. shows igneous rocks, while traces of Palaeozoic elements are found in the Darling Range. There are no Carboniferous rocks at present known in S. and W. A. Metamorphic rocks occur at intervals in Queensland and in the NW. of Arnhem Land. In New S. Wales and the SE. of Victoria sandstone is found among the older substances. A huge area of the continent abounds in Tertiary deposits stated to be Pliocene. These formations include the desert sandstone, coral limestone, and to a large extent the conglomerates and clays of the gold diggings. The earliest discoveries of gold were made in recent and Tertiary alluvia. Quaternary deposits occur in the Upper Macquarie and Upper Murrumbidgee rivers, and they are rich in fossils which supply an illuminating knowledge of the past fauna of A.

The botany of A. contains many characteristics both unique and phenomenal. Its species number many more than are found in all Europe. A feature of the trees growing on the coast highlands is their uniformity of shade. This is a dark olive, and is observed on both the upper and under surface alike. Their foliage extends in a vertical direction, and hence there is a great increase in the amount of available sunlight. In large and monotonous areas is the 'scrub,' a plant of dismal and unbroken appearance. It contains, however, one agreeable type, that of the tea-tree, a flowering shrub and a species of the *Melaleuca*. This is found in nearly every part of the continent. The forests contain many giants, among which is the gum-tree, or *Eucalyptus* (q.v.), attaining a height of 250 ft. with a girth of 12 to 20 ft. while in the S. there are many trees which grow to over 300 ft. high. The valuable she-oaks, beef-woods, or casuarinas are found in the S., W., and interior. They bear no leaves and have at the termination of their branches rigid drooping 'tails.' The jarrah, or Swan R. mahogany, through its power to resist the attack of the white ant, is used for railway sleepers and piles. The most interesting feature is the acacia. It is represented by 300 species, and with their striking yellow blossoms and fragrance provide a great source of beauty. Here and there are spots most luxuriantly vegetated. Palms, Indian figs, creepers, ferns, flame-trees combine to form a harmony of colour. The flame-tree is so named from the effect it presents when in blossom. Its clusters of red flowers, indeed, are sufficiently conspicuous on the mts to act as a signal to ships miles out at sea. Araucarian pines are now confined to A. and adjacent regions. Many European trees have been successfully introduced, and the Scotch thistle, from its readiness to develop, has caused the different municipalities much expense in its extermination.

But if the flora of A. presents strange characteristics, the zoology is even more

striking. The mammals of other lands are absent to a remarkable degree, while the pouch-bearing animals, here so prolific, are only represented elsewhere by the opossums of America. Of these marsupials the largest is the kangaroo, which attains a height of 5 ft. Other varieties are the wallaby, the hare kangaroo, and the rat kangaroo. In New S. Wales and Queensland the fruit-eating bat is found, while seals and sea lions frequent the shores, that of Queensland also abounding in the dugong or sea cow. Phalangers are nocturnal animals,



Australian News and Information Bureau

KOALA BEAR

feeding on leaves and inhabiting the hollows of trees. Flying opossums may be seen at night-time, while the flying mouse, of extraordinarily minute dimensions, is a feature of the continent. Other animals include the tarsipes, a honey-sucker; the wombat, a root and grass feeder; the dingo or wild dog, and the koala bear; native cats; the ant-eater of W. A., and the platypus (q.v.). The introduction of European creatures has proved only too successful. The prolific increase of the rabbit and sparrow has involved the gov. in enormous expense in the attempted suppression of the now-recognised vermin. Originally introduced for the purposes of exploration, the camel is now used with great profit in outlying dists. as a beast of burden. Australian birds excel those of more temperate lands in beauty of plumage and form. Those specially famous for their beauty are the parrot, cockatoo, regent bird, rifle bird, flycatcher, and lyre bird. A scarcity of

fruit and an abundance of flowers cause the prevalence of flower-eating birds, among which are the varieties *Melliphagidae* and *Trichoglossidae*. The emu and cassowary belong to the same family as the ostrich of Asia and Africa. A strange and unsightly bird is the podargus, commonly known as morepork, from its queer cry. There are altogether 650 different species of Australian birds, while Europe can boast only 500. There are many snakes, of which the *Elapinae* (which include the Indian cobra) comprise the majority; the viper is unknown. The bite of 6 of the many kinds of venomous snakes is fatal. Fish teem in rivers and the sea.

Aborigines. The aboriginal inhab. of A. are a distinct species of the human race, probably coming originally from the Malay Peninsula. They are tall and dark-skinned, with black curly hair and wiry physique. In their native, tribal state they are one of the most primitive peoples in existence. They have a complex social organisation, but have no knowledge of metals or agriculture. They lead a nomadic existence wandering in search of game and edible vegetation. Among their weapons is the boomerang (q.v.). Fewer than one-third of the total now live as nomads, mostly in the N. Ter., the N. of W. A., and in N. Queensland. Many live on supervised reservations and others live the ordinary life of the remainder of the Australian community. They are excellent horsemen and many are employed as stockmen on cattle stations. They are remarkably proficient trackers and superb bushmen, and as police trackers have assisted in the arrest of criminals and in the rescue of lost people.

It is believed that at the time of the first settlement in 1788 there were about 300,000 aborigines. To-day there are about 47,000 of full blood and about 27,000 of half aboriginal blood. Of recent years the aboriginal pop. of some areas, notably the N. Ter., has begun to rise slightly. In the early days of colonisation the aborigines, who could offer little resistance to the whites, sometimes suffered at the hands of the settlers, particularly in Van Diemen's Land. On the mainland clashes occurred as the pastoralists moved inland, but the continent provided a refuge until missionaries and humanitarian sentiments were instrumental in securing protection for them. Some states were slow to take action, but by the end of the 19th cent. all had passed legislation making the welfare of the aborigines a public concern. Neglect and misconceived policies rather than ill treatment have led to their decline. In recent years greater efforts have been made to safeguard their welfare, to enable them to take their place as members of the Australian community and to benefit from the social services available in the welfare state. See A. P. Elkin, *The Australian Aborigines*, 3rd ed. 1954.

Population and Products. In addition to a federal gov., A. is divided politically into 6 states, New S. Wales, Victoria,

Queensland, S. Australia, W. Australia, and Tasmania, the la. of Tasmania forming an integral part of the Australian Commonwealth. Added to these are the N. Ter. and Australian Capital Ter. The pop. of the whole continent as at 31 Mar. 1957 was 9,591,437. The people are predominantly of Brit. descent, despite a considerable number of immigrants from other European countries in the years after the Second World War. For the last 10 years natural increase has been relatively high, being about 13 or 14 per 1000 of pop. The total white pop. in 1957 was composed of:

New S. Wales	3,607,698
Victoria	2,659,783
Queensland	1,383,535
S. Australia	868,687
W. Australia	688,132
Tasmania	328,695
N. Ter.	18,254
Australian Cap. Ter.	36,653

For a long time after the colonies were founded they were dependent upon their primary industries, but in recent years industrialisation has made rapid progress, and though primary products still comprise the bulk of exports, they no longer are the greatest source of the national income. Gross value of pastoral production, 1955-6, was estimated at £515,927,000, the greater part of which came from wool (£332,096,000), which has remained the most important single industry in A. Gross value for the wheat crop was £126,091,000. Other important crops are oats, hay, barley, sugarcane, maize, fruit, vines, and potatoes.

Minerals have formed a significant part of A.'s wealth, but in more recent years the value of mineral production has fallen proportionately to that of the great rural industries and is now only about 10 per cent of the net value of production of all primary industries. The discovery of gold was an event of extreme importance in the early economic development of the country; production has since fallen tremendously, though A. remains fourth largest gold producer in the world, value of output in 1956 being nearly £16,345,912. In recent years, with the rapid growth of secondary industries, the output of silver-lead-zinc, iron and copper ores, and coal has increased significantly. Silver-lead-zinc production is now more than 2½ times the value of gold production. Coal deposits are extensive, particularly in New S. Wales, and output in 1956 was 19,290,642 tons of black coal and 10,559,801 tons of brown, mainly from Victoria. Other minerals include tin, sulphur, tungsten, antimony, bismuth, manganese, and uranium. Considerable attention has been paid to uranium since the discovery of the possibility of using atomic energy. Deposits have been discovered in sev. parts of the Commonwealth, and mining has commenced at Rum Jungle in the N. Ter., where deposits are known to be substantial.

A significant feature of the Australian economy in recent years has been the rapid industrialisation. At the turn of

the cent. manufacturing was largely confined to the production of consumer goods and the processing of primary products. After federation a uniform protective tariff provided an incentive to the estab. of new industries, and the fall in imports and the increase in demand during the First World War accelerated industrial development. Iron and steel works and related and subsidiary industries were estab., together with a wide range of high-grade products such as textiles, metal manufs., and electrical goods. Though expansion was checked by the depression, increased protection during the period of recovery and, later, the pressure of demand during the Second World War resulted in further expansion. New industries include the manuf. of motor-cars, tractors, earth-moving equipment, machinery, and machine tools. In 1955-1956 the value of the output of manufacturing industries was £3,761,094, net value being £1,494,790. Manufacturing is now A.'s biggest single economic activity, employing almost double the number of persons engaged in agric., pastoral, and mining industries combined. Primary industries are still of major importance in overseas trade, wool alone accounting for half the total value of exports in 1955-6, and wheat, meats, butter, sugar, and flour are the next in importance. Manufs. comprised only 8.9 per cent of exports, though the proportion had increased since 1938-9 when it was 6.4 per cent. Yet the Australian economy has made remarkable progress towards maturity despite continuing large imports of manuf. goods. See *Year Book of the Commonwealth of Australia*.

Discovery. The actual date of the discovery of A. is doubtful. Various claims are made, among them the sighting of W. A. in 1522 by Magellan's followers. There is no doubt that in the 16th cent. Sp. and Portuguese explorers sailed within sight of the coasts of A. and that Dutch explorers in the first half of the 17th cent. voyaged along stretches of the N. and NW. shores. They were, on the whole, unfavourably impressed and they failed to realise the full significance of the discoveries they had actually made. Belief in the existence of a S. continent gradually strengthened as the trading vessels, on the way from the Cape of Good Hope, touched the W. and NW. shores, and, with the expedition under Tasman, the N. and NW. coasts of A. were accurately charted. See *TERRA AUSTRALIS INCOGNITA*. As far as is known Dampier in 1688 was the first Englishman to sight A., and his report on the NW. coast was not such as to encourage further interest. Tasman had discovered Van Diemen's Land (Tasmania) and New Zealand in 1642, but it was not till 1770, when Capt. Cook explored the entire E. coast of A., that the E. limits of the Australian land mass became known.

Further contributions to the knowledge of the coastline were made by Bass and Flinders, though not till 1843 was the exploration of the whole coastline completed, by Darwin in the *Beagle*. Bass

and Flinders together had circumnavigated Tasmania in 1798. Flinders in 1802 sailed right along the S. coast of the continent, and in the following year circumnavigated A.

Settlement. Cook's discovery of the E. coast of A., and particularly the report by Sir Joseph Banks (q.v.), the scientist, that the land in the vicinity of Botany Bay was fertile and suitable for settlement, encouraged the Brit. Gov. to contemplate the estab. of a colony there for the refugee loyalists of America. The project was abandoned and instead the Brit. Gov. decided to establish a penal settlement. The first fleet, under the command of Capt. Arthur Phillip (q.v.), who was to be the first governor of New S. Wales, as the colony was called, arrived in Jan. 1788. Many difficulties were encountered in the first few years. The land was not as fertile as Banks had anticipated, the convicts were poorly equipped and ill-suited to become settlers, and for some considerable time the colony remained far from self-supporting, and often the whole settlement was placed on short rations. Maintaining discipline was aggravated by the type of man enlisted in the New S. Wales Corps and by the tendency of officers to regard A. as a purely financial speculation. They acquired land, virtually monopolised trade, exploited the colonists to the best of their ability, and finally mutinied against Governor Bligh. This mutiny brought matters to a head in A., and the Brit. Gov. adopted a new policy which was more reasonable. It recalled the New S. Wales Corps, and chose an army officer, not a naval captain, for the next governor.

The arrival of Governor Macquarie (q.v.) accompanied by his own regiment in 1809 inaugurated a period in which the colony ceased to be primarily a jail. Convicts by good conduct might earn their release, and though the support given to emancipated convicts by Macquarie was not always acceptable to free settlers, and the policy was reversed later under Governor Darling, and free settlers who took up land were assigned convicts to work for them, the settlement grew rapidly. The growing proportion of free settlers made the granting of representative and then responsible gov. inevitable.

During the period of Macquarie's governorship the Blue Mts, which had been a barrier to the colony's expansion, had been crossed by Blaxland, Wentworth, and Lawson in 1813. This opened the way for the pastoral industry to spread inland. Already John MacArthur (q.v.), with his experiments in breeding for fine wool, had demonstrated that there was a great future for the wool industry. The crossing of the Blue Mts was the first of a number of endeavours which explored a new land and opened the way for further expansion of the colony. Within 10 years Oxley had explored the headwaters of the inland rivers of New S. Wales; in 1828 Hamilton Hume reached the Murrumbidgee, and 5 years later travelled from Sydney to Port Phillip, crossing the upper

Murray on the way. Sturt (q.v.) in the meantime had solved the problem of where the inland rivers flowed, and Cunningham had pushed N. to the Darling Downs. Later, explorers turned their attention to the centre of A. While Eyre's (q.v.) expeditions in 1840 and 1841, Sturt's journey into the centre in 1844, the ill-fated attempt by Burke and Wills, 1860-1, to cross A. from S. to N., and the more successful expedition undertaken by Stuart in 1862 added greatly to the knowledge of A., they did not have significant effects on settlement because of the barren nature of much of the territory traversed.

When the land was suitable the pastoralists followed close behind the explorers. Between 1820 and 1850 they had occupied 70 million ac., most of the good grazing land in E. A. The expansion was outward from Sydney and, after 1837, from Port Phillip (Melbourne). As early as 1803 two penal settlements had been made in Van Diemen's Land and from there squatters had crossed to Port Phillip. A new settlement was made at Moreton Bay in 1824, but for some years remained primarily a jail. Suspicious of Fr. intentions had promoted the colonisation of Van Diemen's Land and were to influence the settlement of W. A. in 1829. The Brit. Gov. adopted the proposal that 40 ac. of land should be granted to each settler for every £3 or £3 worth of goods he brought with him. Land was granted freely in the first few years but the scheme was not notably successful. Too often large landowners appropriated the best land near the towns, too few labourers were available to work the land, and small settlers often found themselves isolated and far from the towns. The land was not as fertile as anticipated and some years elapsed before the colony became self-supporting. A different experiment had been tried in S. A., where a colony had been founded in 1836 on the principles of Wakefield, that land be sold at a reasonable price and the proceeds be spent on immigration. The new colony also had its difficulties, amongst which was a tendency to speculate in land rather than to develop it, though by the mid 1840's it was prospering and expanding.

Land policy and labour supply were important issues in New S. Wales in this period. Originally convicts or ex-convicts had been the chief source of labour for the colonies, but in the thirties an increasing number of people came to A. as assisted immigrants. As the number of convicts grew proportionately smaller, the agitation for the cessation of transportation gained strength, and in 1840 all transportation to the mainland stopped, though convicts continued to be sent to Van Diemen's Land till 1852. An attempt to revive transportation during the 1840's was defeated. Two issues were involved in land policy. First, there was the question of whether the land should be granted or sold; and, arising from this, the demand that the Brit. Gov. should surrender its control over the alienation of land, a demand which implied self-gov. By 1830 much good

land had already been given to a relatively small number of colonists, and the reversal of the policy in the 1830's, whereby land was to be sold by auction with a fixed minimum price, was bitterly opposed by the squatters. The question was temporarily settled in 1847 when squatters gained the security they sought with the right to 14-year leases and the option at any time of purchasing.

Control over land policy was an important reason for the demand for self-gov.; it also involved a struggle between the squatters and the more democratic section of the community, composed mainly of the assisted immigrants. Since 1823 the Governor of New S. Wales had been assisted by an executive council and a legislative council. The latter was originally nominated but in 1842 became partly elected, though on a franchise such that it was representative of the wealthy landed interests. The Brit. Gov. had conceded in principle responsible gov., and between 1853 and 1859 most of the essential mechanism of parl. democracy had been established in all colonies, except W. A., Queensland being separated from New S. Wales in that year. In the struggle between the two sections of the community, the democratic element had succeeded in defeating the more extreme of the squatters' proposals.

The gold-rushes, which began in 1851 following the discoveries of that year, no doubt hastened the granting of self-gov. and had far-reaching effects on the economic development of the country. Gold trebled the pop. in 3 years, increased trade, and brought enormous wealth to the colonies, but it was not a source of undiluted benefit. Immediate problems were encountered in the administration of the gold-fields, for the miners were lawless and resented the licensing system. Riots were frequent, the most serious developing into the battle of Eureka stockade (q.v.). The rebellion was quickly suppressed but it helped to bring about a number of reforms in the management of the fields.

The prosperity of the early years of the gold-rushes did not last long. The country benefited immensely, but as men began to return from the fields new problems arose. The demand for the opening of the land, which was in the hands of a relatively small number of squatters, resulted in a series of land Acts designed to enable selectors to purchase small holdings for agriculture. Free selection was not notably successful and after 20 years most of the land still remained in the squatters' hands, though they had converted much of it from leasehold to freehold.

This was only one of the problems the states faced during the 50 years after the granting of self-gov., and many of these were problems such as would determine the kind of society which was to emerge in this new country. With some the pattern had been determined by the end of the cent., while others had to await the establishment of the Commonwealth in 1901 for a uniform policy to be pursued. Yet where the states acted independently in many cases

a remarkably uniform pattern emerged. In relation to education and religion, land policy, railways and development, and immigration they pursued policies which were broadly similar. All colonies within a few years of receiving responsible gov. had decided that there should be no state support for religion. In all the trend was to make education free, compulsory, and secular, though this was not done so quickly, nor achieved without bitter disputes. It was, however, a decision which has remained a determining factor in educational policy. Adherents to the Church of England form the largest religious group in the community, twice as big as any other, but the existence of substantial Catholic, Presbyterian, and Methodist minorities has undoubtedly been a major consideration. Theological studies have been excluded from the univs. which have been estab. in each of the cap. cities. In other ways all states progressed in the same direction, undertaking an ever-widening range of activities to assist in the development of the country. They built railways, roads, bridges, telegraphs, constructed irrigation works, hospitals, and schools. All passed legislation to restrict Asiatic immigration. The gold-fields had attracted a large number of Chinese, and as the competition from these began to be felt in the not so prosperous years after the rushes were over, the movement to exclude all who might lower the standard of living gained force. The White A. policy had been determined before federation, and the Commonwealth legislation in the early years of the 20th cent. only made its application uniform. Already by the end of the 19th cent. trade unions were a force in the community, and the political Labour party had been formed.

Protection was one issue where the states adopted divergent policies. The influx of new settlers during the gold-rushes had offered an inducement to manufacturing, and some of the colonies, notably Victoria, sought to stimulate their infant industries with protective tariffs. New S. Wales, preoccupied with questions of land policy, benefiting from large coal resources, and influenced by Parkes (q.v.), a confirmed free-trader, rejected protection. The creation of tariff barriers between the states was a cause of growing friction.

The protection issue provided one of the motives for federation, for the disadvantages and inconveniences of border tariffs were only too obvious. But federation was mooted not only to overcome differences but to give expression and effectiveness to agreed policies. The need for a united voice in external affairs, in providing for the defence of the country, and in dealing with certain social and economic problems, and the advantages of uniform immigration laws, all lent force to the argument for some form of unity. It was, moreover, an expression of the nationalist spirit which had steadily gained strength in the last years of the cent. Throughout the 1890's the issues were debated, and despite some reluctance

on the part of state govts. to surrender their powers, the federation came about, and in 1901 the Commonwealth of A. was estab.

Commonwealth government. According to the Constitution Act of 1900, the gov. of A. comprises the governor-general, representative of the queen, a senate, and a house of representatives. The Senate was to consist of 36 members, 6 from each original state, directly elected for a period of 6 years. The House of Representatives was to consist of 75 members elected for 3 years, proportionate to pop., with a minimum of 5 representatives for each state. Membership of both Houses has since been increased, the Senate to 60 and the House of Representatives to 124, of whom 46 are representatives for New S. Wales, 33 for Victoria, 18 for Queensland, 11 for S. A., 9 for W. A., 5 for Tasmania, and 1 each for the N. Ter. and for Australian Capital Ter., these having limited voting powers.

The div. of powers between state and Commonwealth was made, broadly, on the principle that those powers which were concerned solely with internal affairs should be vested in the states. The restrictions thus imposed on Commonwealth action have at times proved irritating, and on occasions have prevented the gov. from pursuing policies it has considered necessary both for the economic development of the country and for the improvement of social conditions within the community. Frequent attempts have been made to amend the constitution but with little success. Nearly all proposed amendments have been designed to increase Commonwealth powers, but with the exception of 1946, when the Commonwealth was given control of social services, these proposals have been rejected by the electorate. The Commonwealth has desired full powers over trade, commerce, industrial matters, trusts, and monopolies, but though these have been denied it, judicial review and its financial supremacy have enabled it to exert an increasing influence over state policy.

The factors which had induced the formation of a federation, and had helped shape the constitution, largely dictated the problems to which the Commonwealth Parliament first turned its attention. Within a decade legislation had been passed to establish an Australian navy and military force, to impose a protective tariff, and to implement White A., and the first steps towards the social welfare state had been taken with the granting of old age pensions. The Labour Gov. which came into power in 1910 was already beginning to chafe under the limits imposed by the constitution when the outbreak of the First World War over-shadowed domestic affairs, and all parties pledged themselves to support the allied cause to their utmost.

History of Australia during and after the First World War. The solidarity of the Australian people in the crisis of 1914 was an eloquent testimony to the strength of the bonds of the Empire. A div. of troops was immediately placed at the disposal of the Imperial gov., and a small, highly

efficient force was promptly sent to German New Guinea. At no time did A. adopt conscription, though two attempts were made to introduce it. Both times a majority of the people voted against it. The issue roused considerable bitterness, particularly within the Labour party, which, at the cost of some of its ablest members, opposed conscription. This opposition to compulsory overseas service did not mean that most of the people were not sympathetic to the allied cause. Out of 5 million 400,000 enlisted, and total casualties were approximately 220,000, of which the dead amounted to 55,585 and the prisoners of war to less than 200. Sixty-three Australians were awarded the V.C. and 16,814 were awarded other military honours. The Australian war debt was estimated at £300,000,000, the interest on which was £14,000,000, and the ann. charge for pensions was £5,000,000.

Australian troops took part in many of the crucial battles in the war, but it was the Gallipoli campaign that shed an imperishable lustre on their endurance and bravery (see ANZACS and GALLIPOLI CAMPAIGN). They fought also in defence of the Suez Canal and on the Salonika front in the early years of the war, and later in Palestine, Flanders, and France. The Australian soldiers were widely regarded as among the best shock troops in the allied armies. On the Somme, in the Arras area, in the defence of Amiens and the counter-attack, and in the assault on the Hindenburg line the Australians won an enviable reputation as a fighting force. Such battles as Messines, Ypres, Passchendaele, and Mont St Quentin bear testimony to the Australians' valour. Other forces took German New Guinea, Nauru, and the Bismarck Archipelago. These former Ger. possessions were subsequently mandated to the Australian Gov. under the League of Nations. The Australian Navy also served in the war, its most famous feat being the sinking of the Ger. cruiser *Emden* off the Cocos Is. by H.M.A.S. *Sydney* in 1914. See *Official History of Australia in the War of 1914-1918*, ed. C. E. W. Bean.

At the termination of hostilities, A. was represented at the peace conference and became a member of the League of Nations, but while Hughes (q.v.) fought strenuously to safeguard Australian interests in the Pacific and to remove from the covenant any threat to the White A. policy, external affairs quickly faded into the background. Australians were more concerned to get their forces home as quickly as possible and to get back to the problem of developing the continent and improving social conditions. But there was a change in emphasis, in outlook, and in actual policy in the post-war period. Material questions were to dominate the 1920's. Labour had been in the ascendancy before the war but after the split over conscription it lost control, not only in the Commonwealth but in all states except Queensland. By 1924 it had recaptured most of the state govts., but not till 1929 did it regain control in the Commonwealth Parliament. Hughes led a Nationalist

Gov. till 1923, and Bruce (q.v.) a Nationalist Country party coalition till 1929. But the lack of a formative social policy in the 1920's cannot be attributed solely to the loss of Labour leadership. Important, also, was the fact that the arbitration system which had been estab. prewar to regulate wages and working conditions was being seriously challenged, since this undermined the belief in a steady progress towards better social conditions. Throughout the period there were a series of industrial disputes and arbitration seemed powerless to avert them. The situation was aggravated by the div. of the arbitration power between the Commonwealth and the states, with a consequent dual system of regulation, for by 1919 all states had estab. some form of arbitration or wage regulation. The Commonwealth Gov. had tried to make arbitration work, but it failed to persuade the electorate to enlarge its industrial powers and only embittered industrial relations with the introduction of increased penalties for breach of awards. Its subsequent decision to relinquish control of arbitration to the states brought rebellion within its own party and defeat at the hands of the electorate shortly afterwards.

By 1929 the collapse of the defeated gov.'s economic plans was also evident. It had concentrated throughout the 1920's on an attempt to force the pace of economic development, and to this end had generously encouraged immigration and imported capital. Except for a few years before the war there had been no large-scale migration to A. for a considerable time, growth of pop. depending largely on natural increase. The war had helped draw attention to the paucity of A.'s people; the peace brought optimistic estimates of possible expansion. In co-operation with the Brit. Gov., which provided the capital, and the states, which helped settle the migrants, the Commonwealth sponsored ambitious migration schemes, under which £34,000,000 was to be made available for land settlement and for public works associated with this. For despite the development of secondary industries, a development which was assisted during the 1920's by steadily increasing tariff duties, A.'s future was still seen primarily in terms of agric. and pastoral industries. That this scheme was misconceived was soon evident, for even before the effects of the depression began to be felt, inability to sell profitably the primary products from these land settlement areas had become a major problem. In fact the target was nowhere near realised, for only £9,000,000 of the loan money was spent and only 200,000 migrants had arrived when signs of the coming depression brought the scheme to an end. But heavy overseas borrowing in the 1920's and dependence upon primary industries in the export trade left A. particularly vulnerable in the depression. A. was one of the first countries to feel its effects; bad seasons and a disastrous fall in the price of wheat had brought to an end the period of

optimistic expansion by the time of the 1929 election.

The new Labour Gov., under Scullin (q.v.), showed some hesitation in dealing with the situation. Tariffs were raised still higher, but the pursuit of the traditional objectives of economy, retrenchment, and deflation caused dissension in Labour ranks, for it was seen by some to involve greater hardships for workers than for other sections of the community. A compromise policy which called for conversion of loans and a limited amount of inflation was finally evolved, but Labour had been seriously weakened, and, defeated in the 1931 elections, remained in opposition for 10 years. Though economic recovery was comparatively rapid, economic problems continued to preoccupy the gov. throughout the 1930's. The gov. was acquiescent when Britain pursued a policy of appeasement in Europe, and though 1934 saw the beginning of rearmament, it was not until war became imminent that real efforts were made to provide adequate defence.

History of Australia during and after the Second World War. On the outbreak of war the Australian Prime Minister, Mr Menzies (q.v.), took the view that since Britain was at war A. must automatically follow, and accordingly, on 3 Sept. 1939, A. declared war on Germany. A. was in many ways unprepared, and it took some time to organise an effective war effort. Still, from the beginning A. co-operated in the Empire Air Training scheme, compulsory military training was introduced, and before the end of 1939 the second Australian Imperial Force had sailed for the Middle E. Australian troops fought in Greece, Syria, and in N. Africa. The political situation in A. in the early years of the war was unstable. The 1940 elections had resulted in the House of Representatives being evenly divided between Labour and non-Labour, with two independents holding the balance. Menzies remained Prime Minister and the Labour party rejected his repeated proposals for an all-party gov., though consenting to be members of an all-party advisory war council. Labour, with its eyes on the E., had questioned the wisdom of sending Australian forces overseas; the belief that Australian forces in the Middle E. had been used without effective consultation with Australian authorities brought criticism from within the gov.'s ranks. In Aug. 1941 Menzies resigned, and following a brief period when Fadden (q.v.) was Prime Minister, Labour, under Curtin (q.v.), assumed control. Labour had not questioned the participation in the war but merely the disposition of troops, and with the attack on Pearl Harbour (q.v.) in Dec. 1941 the cause of the dispute disappeared. As the Japanese pushed S., the recall of 2 of the 3 Australian divs. in the Middle E. offered little reassurance, for at home there were but 1 armoured div. and 7 skeleton divs. of semi-equipped untrained militia; Britain was obviously too occupied in the European theatre of war to provide effective assistance in the defence of A.; and late in

1941 Curtin made his now famous appeal to America for help, an appeal which was interpreted by some as the severing of the link with Britain, though it was but a recognition of the grave peril in which A. found itself. The rest of the war saw close co-operation between the Amer. and Australian forces. A. became the base for the allied campaign in the Pacific, and under the supreme command of General MacArthur the allied forces halted the Jap. drive in 1942-3, and in mid 1943 began the recapture of the is. and the slow re-conquest of the New Guinea coastline. In 1943 the 9th Div., which had remained in the Middle E. and had assisted in checking the enemy advance into Egypt, had been recalled to join the fighting in New Guinea and the nearby is. The last campaign in which Australian troops fought was the invasion of Borneo in July 1945. *See* PACIFIC CAMPAIGNS IN THE SECOND WORLD WAR.

At home, the impact of the war on the life of the community had been considerable even before the Jap. attack prompted much more extensive gov. controls. At first the gov. showed some reluctance to interfere with traditional economic freedoms, but by 1942 it had rationed a wide range of articles, had pegged wages, controlled prices, and had undertaken the direction of labour. Manpower had become a serious problem as Australian industry expanded under the pressure of the increased demands made upon it, once A. became the base for U.S.A. and Australian forces and a source of supplies. The result was a significant change in the structure of the economy, with the estab. of new 'essential' industries, and the expansion of existing ones. *See* *Australia in the War of 1939-45*, ed. G. Long.

Well before the end of hostilities the gov. had begun to consider the problems which would arise with the return of normal conditions. In 1944 it failed to obtain a constitutional amendment which would have ensured for it, for a period of 5 years, the increased control over the economy which it had enjoyed under its defence powers. It was mindful of the depression which had followed the short-lived boom after the First World War and, intent on avoiding this, it decided that demobilisation must depend upon the rate at which men could be absorbed into the economic life of the community. The maintenance of full employment has been a basic consideration in all post-war policy. The gov. drew up plans for projects which would be undertaken if unemployment threatened, reviving for this purpose, amongst other schemes, that for the unification of railway gauges throughout A. In fact this did not happen; the immediate post-war years were a period of rapid expansion, of rising wages, and overfull employment. The two objectives which have so often shaped Australian gov. policies, the improvement of social conditions of the community and the economic development of the continent, again dominated policy in the post-war period. Even before the end of the war measures had been taken to achieve the

first. Family allowances had been paid since 1941 and in 1945 a comprehensive scheme of unemployment and sickness benefits was introduced. It was some time before the hospital and medical benefits section of the scheme were operating smoothly, but to-day those social services expected in the social welfare state are available to the Australian community.

The two main features of the gov.'s ambitious plans for economic development were immigration and public works. The

1949 was the objective of 70,000 a year achieved, but in the next 3 years it was greatly exceeded. It had been expected that large-scale immigration would relieve the labour shortage, but by creating new demands, notably in housing, schools, and hospitals, it aggravated the situation and was one of the contributing factors to the post-war inflation which reached its peak in 1951. It was by no means the only cause. High wool prices, heavy private investment, home building, and huge public works programmes had also been



Australian Government

AN AUSTRALIAN MERINO SHEEP STATION

Sheep being brought in from the back country for shearing.

war had emphasised A.'s relative emptiness; displaced persons in Europe offered a ready source of migrants and a labour shortage in A. provided an added incentive. Gov.-sponsored migration had been tried before, not always with great success. A significant feature of the post-war policy was the planning before migration started. The key question was how many people could be absorbed without adverse effects on the economy, and it was decided that an intake of 70,000 a year, together with natural increase, would result in a 2 per cent pop. increase annually, this being considered the maximum increase possible without economic strain. Another significant feature of post-war migration was the rejection of the old policies of settling migrants on the land, and of encouraging exclusively Brit. migration. Numerically, the migration programme has been very successful. Since the war over a million people have gone to A. At first the numbers were disappointing, and not till

contributory causes. The Commonwealth Gov. had increasingly taken the initiative in planning projects, in co-operation with the states, for national development, the largest single undertaking being the Snowy Mts scheme for irrigation and hydro-electric works (see above). Through its dominating position on the Loan Council, which determines the amount of loan money to be expended each year, and its exclusive right to impose income tax, the Commonwealth exerts considerable influence over state policy. Since 1950, when it became evident that some measure would be necessary to check the inflation, it has used this influence to cut loan expenditure and works programmes. In 1952 more drastic measures were taken when the Menzies gov. (first elected 1949, re-elected 1954 and 1955) decided it had become necessary to reimpose certain controls, notably import restrictions, if a halt were to be put to inflation. These measures have slowed

the pace of expansion and intake of migrants, but have been reasonably successful in restoring economic stability.

A.'s post-war economic expansion has survived inflationary pressures and periodic waves of acute industrial unrest, in which the extreme Left control of some of the largest unions has played a leading part. Politically, the period is notable as one of great crisis for the Labour party, continuously out of national office since 1949, and since 1954 deeply divided against itself (see EVATT, HERBERT VERE and PETROV AFFAIR). But efforts by the Right (chiefly Catholic) wing to displace Evatt from the party leadership failed throughout 1955 and 1956.

A. has been much more conscious of her relationship with other countries since the Second World War. The danger of invasion had brought forcibly to its attention the need to make adequate defence arrangements, and the search for powerful allies has resulted in an attempt to achieve closer association with the U.S.A., while retaining firm ties with the Commonwealth. Membership of the Anzus pact, a defensive alliance between A., New Zealand, and the U.S.A., and later of S.E.A.T.O., has provided considerable reassurance on this question. But the need of establishing friendly relations with Asian countries has been recognised as equally important. To this end A. has increased her diplomatic representatives to Asian countries, and has made large contributions under the Colombo plan for aid to underdeveloped countries. It has also, through its membership of the U.N., tried to make that organisation an effective force in maintaining world peace. Menzies announced his gov.'s support for Anglo-Fr. action in Egypt Oct.-Nov. 1956, but Evatt led Labour's condemnation of it, and, as in Britain, the action came in for a good deal of criticism from members of all parties.

The Arts. Percy Grainger, the Australian musical composer, has achieved international fame, as have the singers Dame Nellie Melba, Florence Austral, and Peter Dawson. Appreciation of music and drama is stimulated by broadcasts from the national stations of the broadcasting commission and commercial transmitters. In painting a new national school seems in process of evolving. The work of such artists as Tom Roberts, George Lambert, Elioth Gruner, Margaret Preston, and others laid a foundation. In portraiture Wm Dobell is noteworthy, and Will Dyson and Norman Lindsay have gained a reputation for black-and-white art outside their own country. Younger artists show a new 'sense of place.' Among them are Russell Drysdale (1912-), Donald Friend (1914-), and Sidney Nolan (1917-). Every state cap. has its national art gallery and also a state art school. Through the munificent Felton Bequest, the National Gallery of Victoria (now one of the richest-endowed galleries in the world) has laid the foundations of a great collection. Australian literature is dealt with in a separate

article. See P. R. Stephensen, *The Foundations of Culture in Australia*, 1936.

Consult: HISTORY: Historical Records of Australia, ed. J. F. Watson, 1914-25; G. A. Wood, *The Discovery of Australia*, 1922; W. K. Hancock, *Australia*, 1930; *Cambridge History of the British Empire*, vol. vii, Pt I, 1933; S. H. Roberts, *The Squatting Age in Australia, 1835-47*, 1935; E. M. O'Brien, *The Foundation of Australia*, 1937; C. H. Grattan, *Introducing Australia*, 1942, and ed. *Australia*, 1947; P. Serle, *A Dictionary of Australian Biography* (2 vols.), 1949; C. M. H. Clark (ed.), *Select Documents in Australian History, 1788-1900* (2 vols.), 1950, 1955; E. Scott, *A Short History of Australia*, 1950; R. M. Crawford, *Australia*, 1952; G. Sawyer, *Australian Government To-day*, 1952; G. Calger (ed.), *The Australian Way of Life*, 1953; G. Greenwood (ed.), *Australia*, 1955; G. W. Leeper (ed.), *Introducing Victoria*, 1955. **EXPLORATION:** E. Scott, *Australian Discovery*, 1929; C. T. Madigan, *Central Australia*, 1936; J. C. Beaglehole, *The Exploration of the Pacific*, 1947. **ABORIGINES:** B. Spencer and F. J. Gillen, *The Native Tribes of Central Australia*, 1899; H. Basedow, *The Australian Aboriginal*, 1929; Daisy Bates, *The Passing of the Aborigines*, 1940; R. M. and C. H. Berndt, *Arnhem Land*, 1953; A. P. Elkin, *The Australian Aborigines*, 1954. **ECONOMICS AND ECONOMIC HISTORY:** D. B. Copland, *The Australian Economy*, 1931; B. C. Fitzpatrick, *British Imperialism and Australia, 1785-1823*, 1939, and *The British Empire in Australia, 1834-1939*, 1941; G. Taylor, *Australia*, 1940; E. O. G. Shann, *An Economic History of Australia*, 1948; M. Tew, *Work and Welfare in Australia*, 1951; A. G. L. Shaw, *The Economic Development of Australia*, 1955; *Economic Record*. **NATURAL HISTORY:** G. A. Waterhouse, *The Butterflies of Australia*, 1914; K. C. McKeown, *Insect Wonders of Australia*, 1935; C. Barrett, *Australian Wild Life*, 1946; E. Troughton, *Furred Animals of Australia*, 1951; T. G. Roughley, *Fishes of Australia and Wonders of the Great Barrier Reef*, 1951; N. W. Cayley, *What Bird is That?*, 1955; T. Y. Harris, *Wild Flowers of Australia*, 1956. **GENERAL:** *The Australian Encyclopaedia* (2 vols.), 1925; T. Wood, *Cobbers*, 1936; C. P. Conigrave, *Walkabout*, 1938; I. L. Idriess, *Forty Pathways Deep*, 1938; M. Barnard, *Eldershaw, My Australia*, 1930; Arnold Haskell, *Waltzing Matilda*, 1940; S. J. Baker, *The Australian Language*, 1945; G. V. Porus, *Britain and Australia*, 1946; H. L. White (ed.), *Canberra*, 1954. **BIBLIOGRAPHY:** P. Serle, *A Bibliography of Australian Poetry and Verse*, 1940; J. A. Ferguson, *Bibliography of Australia, 1784-1850* (4 vols.), 1941-1955; E. M. Miller, *Australian Literature, 1810-1938*, 1956; *Annual Catalogue of Australian Publications*, pub. annually from 1936 by the Commonwealth National Library, Canberra.

Australia Day, 26 Jan., the anniversary of the foundation of Sydney, New S. Wales, in 1788 by Capt. Arthur Phillip.

Australian Alps, mt range in the E.

highlands of Australia, extending for about 300 m. through Victoria and New S. Wales in a N.E. direction, and forming a continuation of the Great Dividing Range. The chief peaks are Mt Kosciuszko (7328 ft), Mt Townsend (7260 ft), Mt Bogong (6508 ft), and Mts Feather-top and Buller. The mts are mostly well wooded and seldom attain the snowline.

Australian Bight, Great, 1600-m. stretch of ocean S. of Australia and extending from Cape Arid in W. Australia to the Eyre Peninsula in S. Australia.

Australian Commonwealth, federal union of New S. Wales, Victoria, S. Australia, Queensland, Tasmania, and W. Australia, constituted by proclamation on 17 Sept. 1900, under an Act of Parliament dated July 1900, which came into existence on 1 Jan. 1901. See AUSTRALIA.

Australian Literature. The development of A. L. corresponds closely to the social and political hist. of the country and reflects during the first hundred years an uneasy compromise between the traditions of the old world and the conditions of the new. Behind the first settlers lay their homeland 12,000 m. away, around them stretched the inhospitable soil of an alien land. Only time could reconcile them, and only out of acceptance could a native literature emerge. The first writing was descriptive and is found in journals and dispatches of the period, e.g. *A Complete Account of the Settlement of Port Jackson*, 1793, by Capt. W. Tench. Early verse was strongly influenced by Eng. tradition. M. M. Robinson, a convicted blackmailer, composed odes for the king's birthday in 1810 and Mr Justice Field invoked the curious kangaroo in *First Fruits of Australian Poetry*, 1819. Wm Charles Wentworth's ode to *Australasia*, 1823, 'a new Britannia in another world', was the first pub. verse by a native-born Australian, but Charles Harpur (1813-68) was the first poet to show a genuine feeling for the Australian landscape, and Henry Kendall (1839-82) was his direct successor: *Leaves from Australian Forests*, 1869. The first novel, *Quintus Servinton*, 1830-1, by Henry Savery, is a dull convict story full of literary quotations. Of greater interest are James Tucker's *The Adventures of Ralph Rashleigh*, set among convicts, bushrangers, and aborigines in the 1840's, and *Tales of the Colonies*, 1843, by Charles Rowcroft, a Tasmanian pastoralist.

Transportation had ended in 1840, the gold rush of the fifties attracted an influx of new migrants which trebled the pop. in a decade, and the emphasis began to shift from Eng. attitudes to Australian realities. A hard-riding young Englishman, Adam Lindsay Gordon (1833-70), was the first to write in the new spirit. His ballads of *The Sick Stockrider* and *Wolf and Hound* caught the Australian imagination. Other trail-blazing poems are *Convict Once*, by James Brunton Stephens; *An Australian Symphony*, by George Essex Evans; *How He Died*, by John Farrell; and *Where the Pelican Builds*, by Mary Hannay Foott. Four

outstanding novels are *Recollections of Geoffrey Hamlyn*, 1859, by Henry Kingsley (q.v.) (brother of Charles), the first novel of the 'squattocracy'; *For the Term of His Natural Life*, 1874, by Marcus Clarke (q.v.), a powerful, melodramatic convict story; *Robbery Under Arms*, 1888, by 'Rolf Boldrewood' (q.v.) (T. A. Browne), a romantic story of bush-ranging during the gold rush; and *Clara Morison*, 1854, by Catherine Helen Spence, a woman's story of the S. Australia gold diggings written on the spot. Other women novelists were 'Oline Keese' (Caroline Woolmer Leakey), *The Broad Arrow*, 1859; Mrs Campbell Praed, who wrote stories of Brisbane society; Ada Cambridge; and 'Tasma' (Jessie C. Couvreur). John Lang was the first short-story writer: *Botany Bay*, 1859.

In the 1890's the *Sydney Bulletin*, founded to advance the cause of 'Australia for the Australians' and supported by strong national feeling, gave form to a folklore. For half a cent. bushmen in the outback and diggers in the mining camps had yarned around their campfires spinning a folklore of tales and songs in their own humorous, salty idiom. Now, under the vigorous editorship of J. F. Archibald, the *Bulletin* encouraged them to write of their experiences, and A. G. Stephens, an inspired literary editor, trained a new generation of writers. Out of this gathered material there developed the 2 distinctive literary forms of the 1890's, the bush ballad and the short story. 'Banjo' Paterson (1864-1941) (see PATERSON, ANDREW BARTON) collected old bush songs, acknowledging his debt to them in the preface to *The Man from Snowy River*, 1895, and wrote high-hearted ballads of outback adventure that swept through the country. Henry Lawson (1867-1922) (q.v.), with his outback and city ballads full of democratic fervour, and Will Ogilvie, *Saddle for a Throne* (collected 1952), were equally popular. F. J. Brady, *The Ways of Many Waters*, 1899, wrote some of the best sea ballads of modern times, and later came C. H. Souter, John O'Brien, and C. J. Dennis, whose *Songs of a Sentimental Bloke*, 1915, popular verse written in the vernacular, rivalled the ballads in popularity. Henry Lawson (see above) was the first to write about the struggles of bush and city workers in their own language, and his short stories gave a new direction to Australian writing. 'Steele Rudd' (A. H. Davis) created a family of folklore characters in his humorous tales: *On Our Selection*, 1899. Other *Bulletin* writers were 'Price Warung' (Wm Astley), stark convict stories, and Edward Dyson, miners and factory hands. Barbara Baynton, in *Bush Studies*, and Ernest Favenc, in *The Best of Six: Tales of the Austral Tropics*, were both grimly powerful. Louis Becke wrote of the S. Seas, and Randolph Bedford wrote robustly of mining and travel. The first genuinely Australian novel, *My Brilliant Career*, 1901, by Miles Franklin (q.v.), is a bush girl's

spirited protest against her narrow life. *Such is Life*, 1903, by 'Tom Collins' (q.v.) (Joseph Furphy), a rich discursive novel of bullock drivers and outback adventure, has become an Australian classic. In *Jonah*, 1911, Louis Stone broke new ground with a novel of Sydney larrikins.

While the balladists had their heyday, other poets were at work. Of these Bernard O'Dowd (1866-1952) stood nearest to the democratic idealism of the nineties, but his vision was often prophetic rather than poetic. His most famous poem is *The Bush*, 1912. C. J. Brennan (1870-1932), a classical scholar with great beauty of rhythm and language whose predominant mood is despair, is regarded by some as Australia's finest poet: *Poems*, 1914. 'Win Baylebridge' (Win Blocksidge) (1883-1942) was a dedicated poet, but often derivative in style: *This Vital Flesh*, 1939. Two very different lyrists of great beauty are John Shaw Neilson (1872-1942), a simple man and natural singer of spring-like vision (*Collected Poems*, 1934), and Hugh McCrae (1876-), masculine, sensuous, delicate, richly in love with life, his art, and classical fable, the complete antithesis to the aggressive Australianism of the 'Bulletin School' (*Satyrs and Sunlight*, 1928). Other poets of note are Roderic Quinn, James Devaney, Victor Daley, J. le Gay Brereton, David McKee Wright, Louis Esson, Marie Pitt, Dorothea Mackellar, Zora Cross, Nina Murdoch, and Myra Morris. Leon Gellert's *Songs of a Campaign*, 1917, are the finest Australian poems of the First World War.

After federation in 1900 the aggressive Australian note gradually died out of politics and writing, and the First World War finally dispelled the national dream of self-sufficiency. Eng. publishers deluged Australia with popular fiction and many readers became alienated from their own literature. A new generation of novelists achieved little until 1926, when *Working Bullocks*, by Katherine Susannah Prichard, a novel of the W. Australian timber country, heralded a return to genuine Australian writing at a more mature level. Her unself-conscious acceptance of the Australian scene, warm humanity, and literary quality gave great promise which has been fulfilled in a long list of novels and short stories. In 1930 *The Passage*, set in a Queensland fishing community, and in 1934 *The Swappe Family*, brought forward Vance Palmer, novelist, short-story writer, playwright, biographer, and critic. With his wife, Nettie Palmer, critic, essayist, and biographer, he is a major influence in contemporary Australian letters. Australian writers had now begun to turn to the past as though to strike their roots more deeply, and a spate of historical novels began to appear with *The Montforts*, 1928, by 'Martin Mills' (Martin Boyd), a stylish writer whose *Lucinda Brayford*, 1946, and later trilogy all deal with Anglo-Australian squatting families in Victoria. *Uluma Thule*, 1929, the third vol. of Henry

Handel Richardson's (q.v.) trilogy *The Fortunes of Richard Mahony*, a great tragic character novel set on the Ballarat gold-fields, had a spectacular success in England. 'Brent of Bin Bin' (see FRANKLIN, MILES) wrote the first of 3 exuberant chronicle novels of New S. Wales squatting (*Up the Country*, 1928), and Miles Franklin wrote an outstanding New S. Wales pioneering novel (*All That Swagger*, 1937). In 1929 'M. Barnard Eldershaw' (Marjorie Barnard and Flora Eldershaw) began a varied literary career with a tale of old Sydney (*A House is Built*); Brian Penton wrote about Queensland pioneering in *The Landtakers*, 1934, and Ernestine Hill told the story of Matthew Flinders (*My Love must Wait*, 1941). Eleanor Dark had already written sev. contemporary novels, notably *Prelude to Christopher*, 1933, and in 1941 there appeared the first of her impressive New S. Wales historical trilogy, *The Timeless Land*, *The Storm of Time*, *No Barrier*. Two fine novels came out of the war: Leonard Mann's *Flesh in Armour*, 1932, which has been followed by 4 other novels, and *The Wells of Beersheba*, 1933, by F. D. Davison, already author of *Manshy*, 1931, the superbly told story of a red heifer. Norman Lindsay, a brilliant artist and illustrator who has had a great influence on Australian cultural life, wrote *Redheap*, 1930, and *Saturday*, 1933, unconventional novels of life in a Victorian country town, and 2 distinguished expatriate writers pub. Australian novels: *Seven Poor Men of Sydney*, 1934, by Christina Stead, and *Under Capricorn*, 1932, by Helen Simpson. The chief chronicler of the depression was Kylie Tennant with her richly characterised *Tiburon*, 1935, and *The Batters*, 1941. The aborigines were a late subject in Australian writing. Except for Mrs Aeneas Gunn's descriptions of life in the N. Ter. in *The Little Black Princess*, 1905, and *We of the Never Never*, 1908, and poems by James Devaney and Mary Gilmore, there was little of importance written before *Coonardoo*, 1929, by Katherine Susannah Prichard (see above), a sympathetic full-length study of an aboriginal girl, and *Capricornia*, 1938, a brilliant novel by Xavier Herbert which made a scaring attack on their treatment in the N. Ter. Since the war *The Mirage*, 1955, by F. B. Vickers, and *Keep Him my Country*, 1955, by Mary Durack, have presented half-castes and full-bloods with new understanding. Outstanding novels of the war have been *We were the Rals*, by Lawson Glassop; *The Twenty Thousand Thieves* and *The Veterans*, by Eric Lambert; *The Ridge and the River* and *Sowers of the Wind*, by T. A. G. Hungerford; and on the home front *The Fatal Days*, by Henrietta Drake-Brockman; *Come in Spinner*, by Dymphna Cusack and Florence James; and *Southern Steel*, by Dymphna Cusack. Many novelists of the twenties and thirties have continued to write and increase their stature. Other writers of achievement include Patrick White, *The Tree of Man*; Ruth Park, *Harp in the*

South; Eve Langley, *The Peacickers*; Frank Hardy, *Power without Glory*; Robert Close, *Love Me Sailor*; Dal Stevens, *Jimmy Brockett*; Catherine Gaslin, *Sara Dane*; Jon Cleary, *Justin Bayard*; D'Arcy Niland, *The Shiralee*; Gavin Casey, *It's Harder for Girls*; Brian James, *Cookabundy Bridge*; Cecil Mann, *The River*; Judah Waten, *Alien Son*; John Morrison, *Black Cargo*; Alan Marshall, *Tell Me About the Turkey Jo*; Hal Porter, *Short Stories*; and Margaret Trist, *In the Sun*.

Since the First World War Australian poetry has made great progress. 'Furnley Maurice' (Frank Wilnot) (1881-1942) belongs to the period between the nineties and the moderns. His most memorable work is in the fine satiric *Melbourne Odes*, 1935. Mary Gilmore (1865-), a great humanitarian and a spontaneous lyricist of beauty and depth, is still writing (*Selected Verse*, 1948). Three major poets emerged in the 1930's: Robert Fitzgerald (1902-), generally admitted to be Australia's finest living poet, is profoundly thoughtful and a master of the striking image. His famous philosophic poem, *Essay on Memory*, is included in *Moonlight Acre*, 1938. He is now writing narrative poetry based on Pacific hist. and legend (*Between Two Tides*, 1952). Kenneth Slessor (1901-) is the poet of Sydney and its harbour, an intellectual with a rich and vigorous style (*Five Visions of Captain Cook*, 1931, and *Five Bells*, 1939). Douglas Stewart (1913-) (q.v.) is a younger poet of remarkable versatility and originality. He has both dramatic strength and great delicacy (*The Dossier in Springtime*, 1946, and verse dramas: *The Fire on the Snow*, 1943, and *Ned Kelly*, 1943). In 1938 Rex Ingamells (1915-55) founded the Jindyworabaks, a movement to return to the Australian environment for inspiration, which attracted a number of young poets, among them Ian Mudie, W. Hart-Smith, Roland Robinson, Flexmore Hudson, and Gina Ballantyne (*Jindyworabak Anthologies*, 1938-48). In the forefront of post-war lyricists is Judith Wright (1915-), an accomplished poet of original vision and fine invention, a love poet who writes passionately as a woman. Other poets of note are F. T. Macartney, Leonard Mann, T. Inglismore, Ronald McCuaig, and David Campbell, a true singer of the bush; James McAuley, Kenneth Mackenzie, A. D. Hope, J. Blight, Harold Stewart, Rosemary Dobson, Elizabeth Riddell, and Mary Finnin. Among the younger poets are Francis Webb, whose narrative poetry is richly imagined, Nan McDonald, Geoffrey Dutton, Vincent Buckley, and Ray Matthew.

Australians, now largely a nation of city dwellers, still feel themselves strongly tied to bush traditions and adventure, and travel writing flourishes. Among popular writers are Ion Idriess, a prolific spinner of adventure yarns, Francis Birtles, Jack McLaren, Wm Hatfield, Wm Harney, Alan Marshall, Ernestine Hill, and John Ewers. In essay writing Walter Murdoch

is a lonely figure, and in literary criticism the most notable successors to A. G. Stephens are Vance and Nettie Palmer, H. M. Green, A. A. Phillips, and Douglas Stewart. After the First World War Louis Eason and Vance Palmer wrote and worked valiantly to estab. a modern Australian theatre which has been kept alive through the support of the little theatres and broadcasting. The theatre prospect has improved considerably since 1954, when the Elizabethan Theatre Trust was estab. to promote native theatre, opera, and ballet. It has already had an outstanding success with *The Summer of the Seventeenth Doll*, by Ray Lawler. Among contemporary playwrights are, George Landen Dann, Alexander Turner, Sumner Locke Elliott, Henrietta Drake-Brockman, Catherine Shepherd, Dymphna Cusack, Catherine Duncan, Dorothy Blawett, Betty Roland, and Orli Gray. Douglas Stewart's fine verse drama is in a class apart. The Commonwealth Literary Fund helps writers by means of ann. fellowships, subsidised pubs., and univ. lectures. The first chair of A. L. is to be estab. shortly at Sydney Univ. Three quarterly magazines, *Meanjin*, *Southerly*, and *Quadrant*, pub. original prose and verse, and the *Sydney Bulletin* is still the best market for free-lance writers. Two anthologies, *Australian Poetry and Coast to Coast* (short stories), are pub. annually. Although the best Australian poetry is of world standard, it is still chiefly pub. and read in Australia. The novelists, however, are making a name overseas. Having learnt to accept their country unselfconsciously, they have now added a new maturity to their traditional vigour.

Bibliography. E. Morris Miller, *Australian Literature* (a bibliography to 1938, extended to 1950, and ed. by Frederick T. Macartney); H. M. Green, *Outline of Australian Literature*, 1930, and *Fourteen Minutes*, short sketches of Australian poets and their works from Harpur to the present day (revised ed. by Dorothy Green, 1950); M. Barnard Eldershaw, *Essays in Australian Fiction*, 1938; John K. Ewers, *Creative Writing in Australia*, 1945; W. Murdoch and H. Drake-Brockman (ed.), *Australian Short Stories*, 1951; G. Mackenness (ed.), *An Anthology of Australian Verse* (revised ed.), 1952; Vance Palmer, *The Legend of the Nineties*, 1954; D. Stewart and N. Keesing (ed.), *Australian Bush Ballads*, 1954; J. Wright (ed.), *A Book of Australian Verse*, 1956; J. K. Ewers, *Creative Writing in Australia* (revised ed.), 1956.

Australian Magpie, see PIPING CROW.

Austrasia, E. portion of the Frankish kingdom, including Belgium, Lorraine, and the r. b. of the Rhine. The cap. was at Metz. Founded in the early 6th cent., it was ruled until the 8th cent. by the Merovingian kings, and was subsequently merged with Neustria (q.v.).

Austregisille, St (551-624), popularly known as St Austrille or St Otrille. After serving at the court of Gontran, King of Burgundy, he became a monk

(and later abbot) at St-Nizier at Lyons, and subsequently Bishop of Bourges, his native place. His remains, exhumed in 1334, were burnt in the 16th cent. by the Protestants. His feast is on 20 May.

Austreinoine, or **Stremionius**, St (3rd cent.), apostle of Auvergne. He introduced Christianity into Issoire, and the church of St Paul there is on the site of an older chapel built over his tomb. He was the first bishop of Clermont-Ferrand, and founded the abbey of St Allyre. His feast is on 1 Nov.

Austria, **Don Juan d'**, see JOHN OF AUSTRIA.

Austria (Ger. *Österreich*), rep. of central Europe, bounded S. by Italy and Yugoslavia, E. by Hungary and Czechoslovakia, N. by Czechoslovakia and Bavaria, and W. by Switzerland (qq.v.). Area 32,388 sq. m.

Geography. A. is almost completely mountainous: the highest points are reached in the Noric Alps (q.v.), which, with the mts of the Tyrol (q.v.) and the Styrian Alps, extend E. from the main Alpine massif (see ALPS), and gradually slope away towards the Alföld (q.v.) in Hungary. The country lies mainly in the drainage basin of the Danube (which flows W.-E. across the N. provs.) and its tribs., which include the Inn, Enns, Lech, Raab, and Drava (qq.v.). The Rhine (q.v.) flows on the short boundary between A. and Switzerland. The mt and lake scenery of the country is celebrated, and is much visited by tourists. The climate of A. is generally of the central European type with warm summers and cold winters: in dists. above 3000 ft there is usually snow at the end of Dec.; and in Jan. there is usually snow throughout the country. Dists. above 2000 ft have snow until the end of Feb. In the W. mt regions the rainfall is very heavy, but in the E. it averages 20-31 in. A great variety of animals is found, including bears, chamois, and wild goats in the Alpine dists. Colonies of cormorants exist along the banks of the Danube; herons, bitterns, and other water-fowl are found in the Neusiedlersee (q.v.); and in Burgenland (q.v.) is found the curious *Strepensprignaus* (jumping mouse of the Steppes). The flora is equally varied: in the greater part of the country it is central European, with mixed forests; in the S. maize and vines can be grown; on the lower mt slopes spruce and larch are predominant; and in the higher regions, above the firs and rhododendrons, grow the cabbage rose, gentian, blue moonwort, and edelweiss.

Constitution. On 27 April 1945 a Provisional Gov. was set up under Karl Renner (q.v.), and the Rep. of A. was re-established, according to the ideals of the constitution of 1920-9. On 27 July 1955 the rep. became sovereign and independent by the coming into force of the Austrian State Treaty of 15 May 1955 between A. and the occupying powers (Britain, U.S.A., France, and Russia). The last occupation troops left A. in Sept. 1955. The National Assembly is elected every 4 years, and has 165

deputies. The head of the state is called the President, and the gov. is led by a Chancellor.

Local administration and justice. A. is divided into 9 provs.: Vienna (Wien), Lower A. (Niederösterreich), Upper A. (Oberösterreich), Salzburg, Styria (Steiermark), Carinthia (Kärnten), Tirol, Vorarlberg, and Burgenland (qq.v.). In each prov. there is an elected Provincial Assembly. Every com. in the country has a council, by which the burgo-master of the com. is elected. The Supreme Court of Justice (*Oberster Gerichtshof*) is in Vienna. There are 4 higher provincial courts, 20 provincial and dist. courts, and 230 local courts. Trial by jury (abolished in 1934) was reintroduced in 1951.

Population, religion, education, chief towns. The pop., numbering 6,935,000, is almost entirely Ger., but there are small numbers of Czechs and Slavs. In 1951 89 per cent of the pop. was Rom. Catholic, and 6 per cent Protestant. The Rom. Catholic Church has 2 archbishoprics and 4 bishoprics. Education is state controlled for children between the ages of 6 and 14. In 1954 there were 5533 primary schools and 176 secondary schools. There are 3 state univs. (at Vienna, Graz, and Innsbruck), 2 technical colleges (Vienna and Graz), a Rom. Catholic theological faculty (Salzburg), and academies of fine arts, applied arts, and music and dramatic art. The prin. tns are Vienna (the cap.), Graz, Linz, Salzburg, Innsbruck, and Klagenfurt (qq.v.).

Agriculture. Agriculture is restricted by the mountainous nature of the country, but all the available land is cultivated. The chief crops are wheat, rye, barley, oats, potatoes, and sugar-beet. Horticulture is important. In 1954 the numbers of live-stock were as follows: pigs, 2,802,541; cattle, 2,304,350; goats, 280,393; sheep, 277,822; horses, 245,410; and poultry, 9,193,492.

Industry and commerce. The mineral resources of A. are considerable: coal is mined in Lower A., lignite in Styria and Upper A., and iron in Styria, Carinthia, and Salzburg. Lead, zinc, copper, and magnesite are also found, and the country is one of the world's richest sources of high-grade graphite. All oil-producing and refining companies were nationalised in 1946, as were the prin. companies engaged in the following industries: coal mining; non-ferrous mining and refining; iron-ore mining; iron and steel production; the manuf. of iron and steel products (including machinery, railway equipment, and ship-building); electrical machinery and equipment. In 1947 companies supplying electric power were nationalised. Imports into A. in 1954 totalled 8,230,000 metric tons, and exports from A. 5,415,000 metric tons.

Communications. There are about 5000 m. of federal roads, and 13,000 m. of prov. roads. The total railway mileage is 3744, of which some 850 m. are electrified. The country has 6 airports, at Vienna (Schwechat), Linz, Graz, Salzburg, Innsbruck, and Klagenfurt. Itiv. navigation

is important, since there are no sea-coasts: in 1954 2,558,421 metric tons of cargo were carried on the Danube.

Currency, etc. The unit of currency is the *schilling*, which contains 100 *groschen*. The metric system (q.v.) is in use.

History of Austria before 1815. The earliest known inhab. of A. were a Celtic tribe called Taurisci who were succeeded by the Norici. In 14 BC the Romans conquered the Norici, and the ter. N. of the Danube passed into the hands of the Marcomanni, while to the S. were situated Noricum and Pannonia, 2 Rom. provs., in

Leopold of Babenberg with the title of margrave. Under the Babenbergs the dominion received considerable enlargement of ter. and development of its internal strength. Between 1141 and 1177, the E. Mark was united with the Lower Mark, i.e. the ter. lying below the Enns, to form a dukedom under Henry Jasomirgott. To Jasomirgott Vienna owes to a certain degree its re-foundation. The duchy was considerably extended by his successors, the most notable of them being Leopold VI, who campaigned successfully against the Magyars and the



Austrian State Tourist Dept

THE ÖTZTALER ALPS, LOOKING TOWARDS SIMILAUM

the latter of which lay Vindobona, now Vienna. At this time Tirol formed part of Rhaetia. An invasion of the Boii in the 5th cent. destroyed these boundaries, and a period of constant warfare and contention saw the succeeding occupations of the Vandals, Goths, Huns, Lombards, and Avars. Subsequently the Lombards formed a div. between the Avars on the one side and the Bavarians on the other. In AD 791-6 Charlemagne conquered the Avars, and in order to hold his position there securely estab. the E. Mark. It is from this ter. that the Austrian Empire definitely traces its origin and development. Shortly, however, it suffered almost complete obliteration at the hands of the Hungarians, but in 955 Otto the Great defeated them at the battle of Augsburg, thus restoring the E. Mark to the Germans. Later, in 973, he invested

Muslims. In 1246 his successor, Frederick, d. in a battle with the Magyars, and the Babenberg dynasty became extinct.

For a time the country was without a ruler, and in the confusion that followed A., which now included Styria and Carniola, was annexed by Ottakar of Bohemia, but he opposed the imperial control of Rudolf I of Hapsburg, and met his death at the battle of the Marchfeld, 1278. The emperor passed the ter. to his 2 sons, Rudolf and Albert, but shortly afterwards it was left in the sole possession of Albert. The great administration of the Hapsburgs now began. It was to last, without a break, from 1282 until 1918.

Albert II, who succeeded in 1330, expanded the duchy considerably. Carinthia was acquired in 1335, and

Tirol in 1363, during the reign of Albert III. Albert V, by marrying the daughter of the Emperor Sigismund, succeeded to Hungary and Bohemia, and became German emperor as Albert II. The Hapsburg rulers of A. were from this time (except, nominally, for the years 1740-5) also Holy Rom. emperors until the dissolution of the Holy Rom. Empire (q.v.); so that the hist. of A. from the time of Albert II is inextricably mixed with that of the rest of the empire, though after Charles V's abdication the empire derived its impetus from the Austrian cap., Vienna, where the imperial court was now centred. Frederick III added to the importance of the country by giving it the rank of an archduchy (1453). The Austrian lands had now passed into Frederick's hands, and in 1493 Maximilian I, his son, succeeded him.

From this reign onwards the Austrian Empire under the Hapsburgs began suddenly and remarkably to gain in power and position. By a series of shrewd marriages the dominions leapt to the position of the greatest empire in the world. Maximilian himself married Mary, daughter of Charles the Bold, thereby acquiring the Netherlands. Philip, their son, married Joanna of Spain. Philip d. in 1506, and his son, Charles V, inheriting the united countries, became Holy Rom. emperor, with possessions ranging from Spain to the Hungarian frontiers; but he passed his Austrian possessions to his brother, subsequently Ferdinand I. Bohemia and Silesia were annexed, and a largely unsuccessful attempt was made to conquer Hungary. Ferdinand succeeded to the imperial title when Charles V abdicated and d. in 1564.

Of his 3 sons, the eldest, Maximilian II, inherited the crown of Germany, together with A., Hungary, and Bohemia; Ferdinand, the second son, received Tirol and Upper A.; Charles, Styria and Carinthia. In 1570 non-Turkish Hungary was acknowledged an Austrian possession. Maximilian was succeeded by Rudolf II, whose rule was both incompetent and marked by bitter religious persecution of the Protestants. Eventually he was compelled to surrender Hungary, Bohemia, and A. to his brother, Matthias, who in turn ceded Bohemia and Hungary to his cousin, Ferdinand, who was the third son of Maximilian II. He was succeeded by Ferdinand II, whose rule was ignored by the Bohemians. Instead they nominated the elector palatine, Frederick V, the chief power behind the Protestant union. The Thirty Years War (q.v.) resulted. At the battle of Prague, 1620, Ferdinand was victorious, and Bohemia was subjected to his rule. A severe and bitter persecution of the Protestants followed. The war ended with the Peace of Westphalia, 1648. The duchy of A. itself had remained staunchly Catholic throughout. The rest of the cent. is notable in Austrian hist. for the conquest of Turkish Hungary, finally acknowledged by the treaty of Carlowitz (1699). Leopold I and Louis XIV now struggled together over their claims to

Spain. The war of the Sp. Succession (q.v.) followed, in the midst of which Leopold d. The war was carried on by Joseph I, who, dying without issue, was succeeded by his brother, Charles VI, in 1711. When the war ended A. had gained the Netherlands, Milan, Naples, Mantua, and Sicily. In 1740 the male line of the Hapsburgs became extinct, the succession being vested in Charles VI's daughter, Maria Theresa (q.v.).

Under the Pragmatic Sanction the other European states had promised Charles to support his daughter's claim to the succession; but on his death Frederick of Prussia immediately claimed Silesia from A. and the war of the Austrian Succession resulted. The elector of Bavaria was crowned King of Bohemia and elected emperor as Charles VII in 1742. Supported by the Hungarians, Maria Theresa, undaunted, managed against her numerous enemies practically to hold her own. At the Peace of Aix-la-Chapelle, 1748, A. remained almost intact, though Silesia was acknowledged as Prussian. Charles VII d. in 1745, and Maria Theresa's husband, formerly the Duke of Lorraine, had been elected emperor as Francis I. In 1756 the treaty of Versailles was concluded in which the long rivalry between the Hapsburgs and the Bourbons came to an end. Chafing at the loss of Silesia, Maria Theresa, with the aid of France, Russia, Saxony, and Sweden, moved against Frederick of Prussia. The Seven Years War ensued, at the end of which the Prussians still held Silesia. Joseph II (q.v.) became emperor on the death of his father, Francis, and in 1780 Maria Theresa d. Joseph's reign was characterised by over-zealous reform. Discontent, roused by the sweeping nature of his sudden changes, fermented in Hungary and the Netherlands, in the midst of which turmoil he d., 1790, after being forced to reverse his entire policy. He was succeeded by his brother, Leopold II, who was successful in restoring peace with the Netherlands and Hungary. But it was becoming increasingly apparent that the empire, centred on Vienna, was finding it more and more difficult to hold together the widely differing elements of which it consisted. The fate of Marie Antoinette, his sister, and her husband, Louis XVI, led Leopold to ally himself with Prussia against France, an alliance which was threatened by his death in 1792. No time was lost, however, for France immediately declared war on his son, Francis II.

During this reign the foreign policy of A. owed most of its effectiveness to Metternich (q.v.), and for sev. decades the actual decline of A. as a great power was successfully concealed. In 1797 France secured Lombardy and the Netherlands. Two years later Francis II united forces with Russia, and the Austrian borders underwent many changes till 1804, when Francis, anxious to prevent an indignity to his country in the event of Napoleon demanding its subordination, abandoned the title of Holy Rom. Emperor, and adopted that of

hereditary emperor of A. as Francis I. The empire was formally dissolved, 1806. In 1809 the Peace of Vienna seriously reduced the Austrian ter., and the emperor's daughter was virtually forced to marry Napoleon.

Austria, 1812-67. In 1812 A. became an ally of Napoleon, without, however rendering him much practical assistance. At the battle of Leipzig, 1814, A., joining the Grand Alliance, assisted in destroying Napoleon's power, and in the following year, at the treaty of Vienna, as a recognition of her struggles and tribulations, she received Venice and Dalmatia, important gains on account of the opening thus afforded for her foreign trade. A long period of external peace followed.

From 1815 onwards internal discontent within the Austrian Empire grew. In Austria itself it was usually constitutional in demand; but in the non-Austrian (majority) sections of the empire it was nationalist as well as constitutionalist in inspiration. The Magyars, Italians, and Bohemians were becoming anxious to govern themselves. In 1848 revolutions broke out over all Europe. In the crisis Metternich fled to England. Austrian power and the A. Gov. lay among the ruins. Chaos followed, the centre of disorder being Vienna. Finally, a check was placed upon the rebellion by Windischgrätz, whose energies in the battlefield crushed an attempt at revolt on the part of the Slavs in Prague.

It was in Italy that A. began first to recover her authority. She regained Lombardy; and the most serious trouble spot, Hungary, was finally subdued in 1849. The Emperor Ferdinand, who had shown little ability during the crisis, then abdicated in favour of the young Francis Joseph (q.v.). Under the direction of Radetzky the reclamation of N. Italy was speedily accomplished, its complete restoration culminating in the surrender of Venice, 1849. Meanwhile A. strenuously opposed a projected confederation of states under Prussia, thereby defeating, for the time being, the Prussian king in his wish to become emperor of Germany.

For the next 10 years a policy of bureaucratic gov. was revived, the constitutions which had been granted in 1849 being destroyed. While there were certain administrative reforms, the nationalist aspirations of the non-Ger.-speaking minorities were vigorously suppressed. Innumerable petty tyrannies only helped to increase the nationalist fervour of the Slavs, Hungarians, and Italians. Moreover, Prussia was becoming increasingly influential in Ger. affairs, though, for the moment, A. was still able to assert her theoretical supremacy there.

The Crimean War indirectly weakened A.'s position in Italy. Sardinia had gained international prestige by joining the Allies in the war. Subsequently, in alliance with Napoleon III, she conquered (1859) all A.'s It. ter. except Venetia.

Prussia was swift to take advantage of A.'s obvious weakness, made very apparent by events in Italy. In 1866 war was declared, and A. suffered heavy defeat at the battle of Sadowa. Prussia now occupied the middle states of Germany which formerly had supported A. At the conclusion of the struggle A.'s



Austrian State Tourist Dept
A ROADSIDE SHRINE

supremacy over Germany was brought to an end, and Sardinia, who had again taken the field against her, demanded and obtained the prov. of Venetia. Austrian influence in the W., so long successfully maintained, was now completely broken.

The Dual Monarchy—Austria, 1867-1914. Hungary's claims to be recognised as a separate and distinct country were now, with great advantage, pressed forward. In 1867, therefore, the Dual Monarchy (q.v.) came into existence. A. and Hungary each obtained separate

constitutions, being linked by the Crown, the Emperor of A. being also King of Hungary. The policy of virtually complete separation was slightly modified after 1907, economic ties after this date being made closer. After 1867 measures towards more constitutional freedom were passed which considerably liberalised political life throughout the empire. The presence, however, of the many nationalities within its borders rendered the task of settling all claims equitably difficult. The Slav element in the pop. throughout regarded itself as being less favourably treated than the Magyars and Austrians, with some justification. The Dual Monarchy, while it made Hungary the most loyal of all the Hapsburg possessions, was in a sense fatal to the Austrian Empire: for, having obtained so much themselves, the Magyars successfully blocked the efforts of other racial groups to gain similar rights.

The foreign policy of A. from 1867 was to create a tangible understanding with Germany and Russia. With Germany the difficulties were not so great, and in 1879 an informal agreement was reached. Bismarck visited Vienna and arranged a treaty by which Germany bound herself to support A. against Russia, while A.-Hungary promised to assist Germany against a combined attack from France and Russia.

During the Russo-Turkish war of 1877-1878 the tension was aggravated by a tendency on the part of the Magyars to sympathise with the Turks. The position was further complicated by the problem of Bosnia and Herzegovina. These 2 states were now (after 1878) under the direct control of A., but A. knew that Russia was fostering Slav aspirations to independence there, in order to extend her own influence in the Balkans.

Austria-Hungary in the First World War. The international solidarity of the Dual Monarchy before the First World War was founded largely on the maintenance of the alliance with Germany, who was by 1914 seeking further excuses for expanding her ter. and influence. A. now had plans for turning the Dual Monarchy into a Triple Monarchy, the third element to consist of the Bosnian Serbs and the Serbo-Croats. But the Serbs in the empire were no longer interested in remaining within it, even on terms of equality with the Magyars and Austrians; their pleas for self-determination were encouraged by Serbia and Russia. When, therefore, the Archduke Francis Ferdinand (a leading supporter of the Triple Monarchy plan) and his wife were murdered in Sarajevo in June 1914 by a Serbian fanatic, it became clear that A.-Hungary would receive the full support of Germany in her hysterical reaction to the assassination—which was an immediate desire to crush Serbia entirely. Germany at once recognised in the situation a favourable combination of circumstances for breaking through the 'iron ring' which she claimed that her neighbours were forging around her. A. was, in fact, a nation urged on to its doom

by the machinations of its far more redoubtable neighbour, who was not really in the least interested in A.-Hungary's own motives in the affair. A.-Hungary sent an ultimatum to Serbia on 23 July, and thereafter events moved rapidly. For though the Serbian Gov. undertook to comply with the demands of A.-Hungary, and offered to refer all disputed points to The Hague or to a conference of powers, the Austro-Hungarian Gov. disregarded the reply and mobilised its army. Germany not only directly promoted the Austro-Hungarian plan of destroying Serbia as an independent nation, but inspired the design of wiping out Russian influence in SE. Europe; and thus within a week of Austria's formal declaration of war against Serbia (28 July) Germany, A., Russia, and France were in a state of war; and this soon involved, through the violation of Belgian neutrality, the intervention of Great Britain. By the end of the first week of Aug. A. had formally declared war against Russia. There being no indication whatever that either of the central powers would make peace separately, the alignment of opposed nations was complete for a general world war (for further details of events leading up to and during the war see WORLD WAR, FIRST).

At the very outset A. had to bear the brunt of the conflict against Russia, and suffered severe defeats in Galicia, 1914-15. A. might in fact have been forced to surrender comparatively early in the war but for the transfer by the Ger. High Command of large forces from the W. to the E. front. In Serbia, however, despite slow initial progress, A. was eventually more successful and overran the country; and though it. intervention on the allied side was a serious strategic blow to her, her armies decisively defeated Italy at Caporetto in 1917.

But within the empire internal discontent among the national minorities, and among Liberal and left-wing elements in A. proper itself, was rising. The war was revealing A.'s serious administrative and economic weaknesses, as well as her political sterility in the light of 20th-cent. development. The allied blockade seriously affected A. early in the war. But while the aged Emperor Francis Joseph lived the empire held together. He *d.* in 1916, and was succeeded by the Emperor Charles.

Charles at first hoped to hold the empire together by converting it into a four-fold kingdom, consisting of A., Hungary, the Serbs, and the Czechoslovaks. But the situation among the Slav minorities had deteriorated too far to allow this to be a practical possibility. The Czechs and Serbo-Croats were now only interested in independence.

In 1917 A. made peace overtures to the Allies, but these were rejected. Meanwhile, attempts at placating the Slavs having failed, Austro-Hungarian dominance was again asserted in domestic affairs. In 1918 A., urged on by Germany, launched a large-scale offensive on the Hungarian front. It was a disastrous

failure. Meanwhile, unrest among the minorities was reaching its climax, and by now the Poles in the empire had joined the Serbs and Czechs in their demand for independence. Very soon national councils of the various subject nationalities were formed in the great allied camps, and in America. Pan-Slavic congresses had been held in Prague and Agram in the winter of 1917-18. These were followed by the historic Congress of Oppressed Nationalities, convened in Rome in April 1918. The Allies now openly took up the cause of these nationalities, and organised armies of Poles and Czechoslovaks were aligned with the allied troops. At a meeting of the Supreme War Council in Versailles in June, the Brit., Fr., and It. premiers adopted resolutions to the effect that a united and independent Polish state was a *sine qua non* of peace. The complete independence of Czechoslovakia was also formally recognised by the prin. allies and by the U.S.A. in the early autumn.

Still the tottering empire survived; but in Oct. 1918 the Italians launched a crushing offensive on a front from the Piave to the Alps. Within a fortnight the Austrians were completely overwhelmed; Trent and Trieste were captured, and 300,000 Austro-Hungarian prisoners, together with nearly all their stores and 5000 guns, were taken. An Austrian mission then came to the H.Q. of Gen. Diaz and offered unconditional surrender, and an armistice was signed on 3 Nov., without awaiting the outcome of the Ger. negotiations. This reverberating disaster to the Austro-Hungarian armies quickly led to the final disruption of the Dual Monarchy. In Oct. Czechoslovakia's independence was declared in Paris, and very soon a constitution was drafted for the new rep., with Masaryk (q.v.) as president, and the first National Assembly was convened in Prague to ratify the new regime. Also in Oct. the Croats formally declared the deposition of Charles, and the separation of their new kingdom of Croats, Serbs, and Slovenes, with King Peter of Serbia as King of Yugoslavia. The other nationalities, Transylvania and Bukovina, then in their turn seceded from A. and Hungary respectively, and negotiated for union with Rumania. It was next the turn of Hungary herself, where liberal elements were now in control. At the end of Oct. Karoly (q.v.) announced that the Magyars were freed from further allegiance to the Emperor Charles, and would be constituted an independent rep. The Dual Monarchy was thus, at long last, at an end. The culminating blow to the 'ramshackle empire' was delivered in Vienna, when a mass demonstration of students and workers called for a democratic administration. Charles abdicated; and in Nov. the National Assembly in Vienna formally declared Ger. A. a rep.

History of Austria from 1918. The Rep. of A. was declared on 12 Nov. 1918, and the gov. assumed by a National Assembly which appointed a provisional cabinet.

A peace treaty signed in Sept. 1919 declared A. an independent state, and gave her an area roughly one-eighth the size of the old A.-Hungary. Early in 1919 the National Constitutional Assembly, consisting of a single chamber, was elected on the basis of universal and proportional suffrage. Under the constitution which came into operation in 1920, a president was chosen for 4 years by both Houses. The Legislature comprised an Assembly, the Nationalrat, and a First Chamber, the Bundesrat, the one elected by popular vote, the other chosen by the provincial diets. The powers of



Austrian State Tourist Dept
GRAPE GATHERING IN CARINTHIA,
LOWER AUSTRIA

the Bundesrat were advisory and negligible.

The political hist. of A. from 1923 was characterised by a bitter struggle between the Social Democrats and the Christian Socialists (who had substantial middle-class support). Socialism, as was to be expected in a state dominated by the city of Vienna, whose workers had played a decisive part in establishing the rep., had great influence in the National Assembly immediately after the overthrow of the Dual Monarchy. The first chancellor was the Socialist leader Renner (q.v.), whose domestic policy it was to establish a working agreement between the Social Democrats and the Christian Socialists. The elections of Oct. 1920 gave a majority, but not a working majority, to the Christian Socialists, and this resulted in the Christian Socialists allying for the next few years with the pan-Ger. party. For a considerable time the chief issues were the Tirol question and the *Anschluss*,

or union, with Germany, the two being, in a manner, allied, as both had relation to pro-Ger. sympathies. The Tirol question concerned the protection of the Ger. minorities in the Tirol—which old Austrian crown land, after the First World War, was divided between A. and Italy, the N. going to A. and the S. to Italy—and was of considerable importance even outside the 2 countries immediately affected, because upon its solution depended the further question whether A. could retain even so much of the crown land as was left to her by the peace treaty. The practical acquiescence of successive Austrian govts. in the Tirol situation as it had been decided in the peace treaty, in spite of Fascist Italy's open policy of forcible 'Italianisation' of her section of the area (an acquiescence made necessary by A.'s strategic helplessness, relative to Italy), drove many moderate but patriotic Austrians into the extreme pan-Ger. camp. A.'s unstable economic position, producing as it did chronic poverty and unemployment, led to the growth of extreme leftist groups in Vienna itself, and this led to equal extremism among the non-Socialists. It also led many thinking Austrians to decide that A. would never have stable gov. until she became more of an economic reality—and this was increasingly considered to mean union, at least economic, with Germany.

In 1927 there was serious Social Democrat rioting in Vienna. One result of this was the formation of the *Heimwehr*, or bourgeois private army, which was designed as a challenge to the activities of the Socialists' illegal armed bands, which, in times of stress, patrolled Vienna in the hope of overthrowing the middle classes. Far from achieving that result, a repetition of the July riots was only narrowly averted in the following Oct., when the Socialists and the *Heimwehr* came into collision at Wiener Neustadt, the recognised H.Q. of the former force. In the elections of 1930 the Social Democrats replaced the Christian Socialists as the largest single party, but they too had to rely on the support of the pan-Ger. group. In 1931, in face of A.'s worsening economic position, caused by the world depression, a customs union with Germany was concluded. Two months later the biggest bank in A. failed: the gov. fell, and the Christian Socialists returned to power. The customs union was immediately renounced.

Internal tension was growing. In 1932 Dollfuss (q.v.), a Christian Socialist, became chancellor. He allied with the *Heimwehr* group to maintain his position, and adopted a line independent of both the pan-Germans (by now Nazi in character) and the Socialists. To do this he had to resort to dictatorial methods. In Feb. 1934 the Socialists rose in revolt against the *Heimwehr* under Stahremberg (q.v.), and for sev. days there was civil war in Vienna and in some of the larger prov. tns. The rising was crushed with heavy loss of life to the Socialists, and

their leaders were executed; but Dollfuss, who had suppressed the rising, now forfeited much of the support he had previously gained in foreign countries for his resistance to the Ger. Nazis, besides driving the Socialists into a conspiracy with the Austrian Nazis to overthrow his gov. Stringent laws against political violence were now introduced, a new constitution proclaimed which made A. a corporative, not a democratic, state, and some of the Nazi conspirators were imprisoned, with the result that in July there was a sudden (unsuccessful) Nazi revolt; Dollfuss was assassinated and succeeded in office by Schuschnigg (q.v.). After 1934 Austrian independence was virtually surrendered, inasmuch as Austrian policy was soon forcibly assimilated to that of Germany under an agreement with the Nazi Gov. of that country. Finally, in 1938, the president was forced to resign; the chancellor, Schuschnigg, was put into prison; the army was incorporated with that of Germany; diplomatic representation abroad was taken over by Germany; the Austrian Diet was dissolved; the Ger. mark substituted for the Austrian schilling; and the country subordinated to the Reich as the Ger. prov. of 'Ostmark', under Hitler's dictatorship. Thus was A. annexed by Germany without resistance and the *Anschluss* had become an accomplished fact.

Though many Austrians originally welcomed the *Anschluss*, serious opposition, though largely unorganised, existed to it from the start, and by 1943 the attitude of the Austrian people generally was anti-German. Sabotage in agriculture was a prominent manifestation of that attitude. Then came opposition by industrial workers, who suffered heavy losses at the hands of S.S. execution squads. But A. was useful to Germany as an air-raid shelter, and well-to-do Germans evacuated their families to A. even before the mass evacuation to the Alpine dists. Hence A. suffered from a shortage of houses and food, and in 1943 the pop. was 10,000,000 compared with 7,000,000 before the war. At the Moscow Conference (Oct. 1943) Great Britain, America, and Russia pledged themselves to restore the independence of A. The armed forces of A. were enrolled with those of Germany, and used throughout the campaign against Russia; but in 1945 the Russian armies invaded A. and captured Vienna (13 April). For the campaign in A. see EASTERN FRONT or RUSSO-GERMAN CAMPAIGNS IN SECOND WORLD WAR.

On 27 April 1945 a provisional Austrian Gov. was set up in Vienna. This was recognised by the Allies as the rightful Austrian Gov. in Oct. Its constitutional structure was based on the constitution of 1920. Elections held in Nov. 1945 returned the People's party (Catholics) as the largest single party. Subsequently Figl became chancellor, while Renner, the veteran Socialist, became president. After the cessation of hostilities various zones of A. were occupied by allied forces

and administrations: the NE. or Russian zone included Lower A. (excluding Vienna), that part of Upper A. lying on the l. b. of the Danube, and Burgenland; the NW. (Amer.) zone included Salzburg prov. and the rest of Upper A.; the W. (Fr.) zone included Tirol and Vorarlberg; and the S. (Brit.) zone included Carinthia (including Ost-Tirol) and Styria (excluding Burgenland). Vienna, within the 1937 boundaries of the city, was jointly occupied by armed forces of the 4 allied powers, and its administration directed by an inter-allied governing authority of commandants appointed by the respective commanders-in-chief. At a meeting in Sept. 1945 the allied council of foreign ministers decided that the frontier of A. would not be changed save for minor rectifications, and this decision therefore barred the restoration to A. of the S. Tirol, of which she was deprived in 1919, unjustly in the opinion of many, unavoidably in the view of most. Since 1945 various It. acts in the Ger.-speaking areas of the It. Tirol have caused some renewed popular agitation in A. for a revision of the Tirol frontiers in A.'s favour.

The post-war Austrian Gov. concentrated on the problems of reconstruction. Vienna had suffered severe damage during the final fighting, and considerable programmes of rehousing were inaugurated. But the div. of A. itself and of Vienna into separate zones hindered economic recovery. The 4 occupying powers discussed the question of an Austrian peace treaty at frequent intervals: but for sev. years no agreement could be reached, and the military occupation of A. continued.

The elections of 1949 ensured a continuance of power for the People's party: in the 1953 elections they lost ground to the Socialists, but were able to retain office in a coalition gov. which included Social Democrats and Independents, though led by a People's party chancellor. In 1950 Renner d.: he was succeeded by Theodor Koerner, also a Socialist, who d. early in 1957. Raab succeeded Figl as chancellor after the 1953 elections.

In May 1955 the ambas. of the United States, Britain, France, and Russia began talks in Vienna on the subject of an Austrian peace treaty. On 15 May the treaty was signed. It became operative on 27 July 1955. A.'s sovereignty was recognised. The occupation forces were withdrawn, and A.'s future neutrality was laid down. Considerable reparations were to be paid by A. to the Soviet Union over a period of 10 years.

In 1957 suggestions that A. should join the European Coal and Steel Community were resisted by Russia on the grounds that such action would infringe the perpetual neutrality of A. as laid down in the 1955 treaty. That such action was being considered is evidence of A.'s pressing need to achieve genuine economic security, for though, since 1955, her economy has appeared healthy enough, this condition is to a great extent the result of substantial economic aid from

the W. in the period immediately after the Second World War. *See also* EUROPE, *History*; GERMANY, *History*; HOLY ROMAN EMPIRE; HUNGARY, *History*, etc.

For *Austrian Architecture, Art, Literature, Music*, see GERMAN.

BIBLIOGRAPHY (general in character): J. Bryce, *The Holy Roman Empire*, 1864 ff.; H. A. L. Fisher, *The Medieval Empire*, 1898; A. Feller, *Das neue Österreich*, 1924; C. A. Macartney, *The Social Revolution in Austria*, 1927, and *Problems of the Danube Basin*, 1942; Cicely Hamilton, *Modern Austria*, 1935; A. W. A. Leeper, *A History of Medieval Austria*.



Austrian State Tourist Dept

LOFER, SALZBURG PROVINCE

1941; A. J. P. Taylor, *The Habsburg Monarchy, 1815-1918*, 1941, 1948; Mary Macdonald, *The Republic of Austria, 1918-34*, 1946; K. von Schuschnigg, *Austrian Requiem*, 1947; K. W. Rothschild, *The Austrian Economy since 1945*, 1950; R. Hiscock, *The Rebirth of Austria*, 1953; H. Benedikt (ed.), *Geschichte des Republik Österreich*, 1954; and K. Gruber, *Between Liberation and Liberty* (Eng. trans.), 1955.

Austria, Lower (Ger. *Niederösterreich*), prov. of NE. A., bordered on the N. by Czechoslovakia. It is bisected E.-W. by the Danube, to the N. of which is a wooded tableland, adjoining in the NW. the Forest of Bohemia (q.v.). S. of the riv. are offshoots of the E. Alps, the highest being Mt Schneeberg (6808 ft). Before the First World War L. A. was a crown land, the E. half of the archduchy of A. There are extensive vineyards, agriculture, and stockraising in the NE. and centre. Textiles, chemicals,

tobacco, glass, and sugar are among the manufs. The prin. tns are St Pölten, Wiener Neustadt, and Krems (qq.v.). Area 6950 sq. m.; pop. 1,400,500.

Austria, Upper (Ger. *Oberösterreich*), prov. of NW. A., bordered on the N. by Czechoslovakia and on the W. by Bavaria. It is traversed NE.-W. by the Danube, to the N. of which lie tablelands of the Forest of Bohemia (q.v.). S. of the riv. are mts and large lakes of the E. Alps. Before the First World War U. A. was a crown land, the W. half of the archduchy of A. The chief occupations are agriculture and forestry. Salt, lignite, gypsum, and granite are found, and there are brewing, distilling, metallurgical, textile, paper, and glass industries. The prin. tns are Linz (the cap.), Steyr, Wels, and Gmunden (qq.v.). Area 4630 sq. m.; pop. 1,108,720.

Austria-Hungary, see *AUSTRIA, History, Austrian Architecture, Art, Literature, Music*, see *GERMAN*.

Austronesian, see *LINGUISTIC FAMILIES, Malay-Polynesian*.

Autarky (Gk *autarkia*, economic self-sufficiency). The idea that a country should produce everything it requires and cut down foreign imported goods gained considerable impetus after the First World War. Eire and Italy are 2 outstanding instances, but in neither case was the experiment a success. Hitler's 'new order' (1941) stultified the efforts of other European countries in this direction. The movement for A. in Nazi Germany itself, however, provided the best instance, being based primarily on military considerations in the hope of making the country immune from the rigours of blockade. *Autarky* (Gk *autarkhia*) means the gov. of a single person, or absolutism (q.v.).

Auteuil, dist. of Paris, on the r. b. of the Seine, close to the Bois de Boulogne, known for its steeple-chasing course. Molière and Boileau-Despréaux lived here, and it was the favourite resort of La Fontaine, Condorcet, and other literary figures.

Autheon, or Autun, Jehan d' (c. 1466-1527), Fr. poet and historian, was a native of Beaupaire, and a Benedictine monk. He was historiographer to Louis XII, the subject of his chief work, *Chronique du roi Louis XII*.

Authorised Version (of the Bible), first pub. in 1611. It is the only version 'appointed to be read in churches,' and until fairly recently its title-page contained the words 'printed by authority.' It has held its place so long more by its own merits than by the artificial support of law, though there are numerous minor defects, corrected in the R.V., and for nearly 3 cents. it has been the most potent factor in the spiritual educ. of the Eng.-speaking race. See *BIBLE*.

Authors' League of America, founded in 1912, opens its membership to authors and playwrights, provided that they make a regular profession of their work and are not merely unpaid amateurs. The league gives valuable advice to its

members on the placing of their works, advises them as to the proper rates of remuneration, and assists them in contractual analyses. The H.Q. are in New York.

Authors, Playwrights, and Composers, The Incorporated Society of. In 1883 Sir Walter Besant and a small group of leading writers of the time decided to form a society, provisionally called the *Company of Authors*, to protect and further the interests of authors. In 1884 a memorandum and articles of Association were settled and the society was estab. as the *Society of Authors*. Tennyson was its first president, and was followed in turn by Meredith, Hardy, and Barrie. The present president is Dr John Masefield. During the years since its foundation the society's scope has been continuously extended until to-day, within its framework, separate associations have been created for playwrights, screenwriters, and writers for radio and television. Members are entitled to legal as well as general advice in connection with the marketing of their work, their contracts, their choice of a publisher, etc. The society also undertakes litigation on their behalf in any part of the world in which their rights or interests are involved, provided that the Committee of Management is satisfied that the member's case is sound both in law and in ethics. The offices of the society are at 84 Drayton Gardens, London, S.W.10; the society's quarterly jour., *The Author*, has been pub. without break since 1885.

Auto, name of various types of religious and morality plays popular in Spain and Portugal from the 12th cent. onwards, and still performed in the latter country. They reached their highest perfection in the *As. sacramentales* of Lope de Vega (1562-1635) and Calderón (1600-81). The former was the author of 400 A.s. These plays were generally represented on religious festivals, especially the feast of Corpus Christi. They were mostly of an allegorical nature, the leading characters being personifications of vices, virtues, etc. They were frequently produced with great elaboration.

Auto-da-fé (act of faith), ceremony of the Inquisition in Spain and Portugal at which heretics were burnt after a public procession and service in the church. All Saints' Day was a favourite day for the A. An A. was celebrated in Mexico as late as 1815.

Auto-intoxication, condition subsequent upon the production within the body of poisons due to perverted functions of organs or tissues. As all the tissues of the body are mutually interdependent, defect in one part is followed by widespread effects, and the symptoms of A. are accordingly very varied. Among the most common types are uraemia (q.v.), or excess of urea in the blood; Graves's disease, or thyrotoxicosis (q.v.), due to excess of thyroid secretion; the delirium and coma of diabetes, caused by the saturation of the sodium salts of the blood by acetoacetic and oxybutyric acids, the products of imperfect proteid

metabolism; some forms of acute insanity, caused by defective metabolism or physiological instability, or both; and general symptoms produced by fatigue or indigestion.

Autobiography, see BIOGRAPHY.

Autocars, see MOTOR CARS AND MOTOR CYCLES.

Autochthones, Gk for aborigines, the first inhab. of a dist. as distinct from later-comers. In Gk mythology the A. were supposed to have sprung from the rocks and trees.

Autoclave, air-tight heating vessel, on the principle of Papin's digester, made of iron or steel, usually supplied with a safety-valve, in which substances can be heated above their boiling-points under pressure. Various types of A. are used for sterilisation and chemical and cooking purposes. In chem. A.s are used to produce reactions under great pressure.

Autocracy, see GOVERNMENT.

Autogiro, see ROTATING WING AIRCRAFT.

Autograph, something written in a person's own hand. The term is applied both to mere signatures and to documents of any description. A. hunters have become one of the accepted nuisances of modern civilisation, but they may claim to be carrying on a custom which seems to have its origin as early as the 14th cent., in the *Liber Amicorum*, a kind of visitors' book. In the 16th cent. were formed such famous collections of A.s as those of Loménie de Brienne and Lacroix du Maine. Evidence of a craze for the signatures of celebrities is afforded by a number of albums of the time of Elizabeth I and James I now in the Brit. Museum. Amongst high prices which have been paid for A.s of famous people are the 300 guineas paid by the Brit. Museum in 1858 for a Shakespeare signature, and the £65 for a letter of Defoe, 1887. Many collections of A. reproductions have been pub., notably Nichols's *Autographs of Royal, Noble, Learned, and Remarkable Personages*, 1829, Delpech's *French Autographs*, 1832 and *Facsimiles of Royal, Historical, Literary, and other Autographs in the British Museum*, 1896-1900. See also Scott and Davy's *Guide to the Collector of Historical Documents*, etc., 1891, and Broadley's *Autographs*, 1910. The relation between A.s and character has been ingeniously treated in Poe's *Chapter on Autography*. See also PUBLIC RECORD OFFICE.

Autolycus: 1. Son of Hermes, and grandfather of Ulysses, notorious for the cunning with which he stole his neighbours' flocks, until at last detected by Sisyphus, who marked his sheep under the feet. Shakespeare's A., in the *Winter's Tale*, has similar characteristics. 2. A. of Pitane, early Gk writer on mathematics and astronomy (fl. 4th cent. bc), who is reputed to have taught Arceilaus.

Automatic Action, physiological and psychological term used to denote all non-reflex actions which are not the result of conscious endeavour. Actions may be purely automatic when they are performed

while the attention is fixed altogether upon another object, or relative, when the details of an action are performed unconsciously while the attention is fixed upon the end or some other part of that action. Sleep-walking is one of the most common forms of A. A., and many of the phenomena of divination, spiritualism, etc., may be explained on this basis. A. A.s are distinguished from reflex actions by being produced by an internal instead of an external impulse, but in practice the two are frequently indistinguishable.

Automatic Machines, see AUTOMATION and ELECTRONIC COMPUTATION.

Automation, term applied to processes and machinery automatically controlled and to electronic computation (q.v.). The word comes from 'automaton' (derived from the Greek), a machine that imitates the action of men and animals, of which the first recorded seems to have been the wooden pigeon made by Archytas of Tarentum in 400 bc. A. has, in recent years, developed with unusual speed. In industries such as chemicals and oil-refining, for example, entire processes have become very nearly automatic. In offices and factories, electronic computers (or 'electronic brains') are becoming so good at routine clerical work that it is possible to envisage them taking over the central control of manufacturing processes and so bringing the fully automatic or 'push-button' factory within grasp. Present-day advances in A. are best reviewed under 3 heads—advanced mechanisation, control of processes, and electronic computation.

Mechanisation, the substitution of mechanical for manual operation in industry, has been going on steadily since long before the Industrial Revolution in England in the 18th-19th cents. During that time the actual working processes in certain simple crafts, e.g. spinning and weaving, were mechanised. But some of the early looms and lathes required skilled operators only to set and maintain them. In the process (or evolution) to a more complete mechanisation, America has led the way in the course of the last 100 years. The term 'robot' was also given earlier in this cent. to mechanisms devised to do the work ordinarily handled by man. Robot machines have been used to steer ships without human aid (1927), to operate telephone transmitters (1927), and to pilot an aeroplane (1931). Other forms of automatic mechanisation in use for many years include the coin-operated machine which, after testing the genuineness of the coin, delivers the packaged goods contained inside. Through the dual agencies of motion study and the production line more and improved machinery has gradually been developed, while the burden of loading and handling between operations has been lightened, and in some factories completely removed. Of the highly automatic machinery in use to-day the best example is perhaps the transfer-machine; this is really a series of machine-tools, each doing one operation automatically and

linked in a continuous production-line by mechanical devices that transfer components from one operation to the next. But complete mechanisation has so far been achieved only in a few industries, even in the U.S.A.

Control of processes by automatic action has a long hist. The control valve of the pressure-cooker, for instance, dates back to 1680. Early examples were mostly mechanical gadgets, little used in industry. Progress was slow until this cent., but the military needs of the Second World War provided a powerful stimulus and the pace has quickened. Automatic control is most advanced in industries where materials are easy to handle, such as in chemicals and oil-refining as already mentioned, and in food-processing. These industries have become highly automatic without any of the well-known inventions, such as transfer-machines or electronic computers. A system of control usually consists of 3 basic units—one that measures, one that controls, and one that corrects. Most controlling instruments are pneumatic, but some are mechanical or hydraulic. Electric or electronic units are now coming into favour, chiefly because they are fast and able to send signals over long distances, so giving 'remote' control. Only with the further development and improvement of instruments that will rapidly analyse the chemical composition of materials can automatic control be based on the quality of the final product; at present the product has to be tested at intervals and the process adjusted if necessary. Sev. analysing instruments, for which there is an immediate call, are already being developed. Electronic computers have brought full A. in offices much nearer. They have been developed only in recent years, but for most of this cent. machines based on punched-card systems have been taking over routine calculations from clerks (see ELECTRONIC COMPUTATION).

Current trends are leading towards the fully automatic factory. Some plants making simple products are already almost automatic. So are a few more complex factories except for the central control of what goes on. Although there may be automatic control of each process, it has yet to be extended to whole systems of production. But it is possible to envisage this being done with the help of an electronic computer. The master computer could plan production according to its analysis of orders received and expected, and it would set and change the programmes of the machines and their control-mechanism. The only manpower then needed would be managers, technical specialists, some clerical workers (including those who fed information to the computer), a few operatives to mind machines or watch processes, and skilled maintenance men. The electronic computer, though still confined to routine office calculations, is capable of making the more advanced calculations that are required for the central control of

production, but more has still to be known about the processes it is intended to control.

Even so, the computer has opened a new chapter in the hist. of A. Progress must depend at first on the willingness of pioneer firms to act with imagination and to take risks. Steady development in A. can be expected in many industries (in some it will affect few basic operations and few employees), but the shortage of trained managers, engineers, and technicians will probably be the most important brake on progress. A. calls for planning and control of a very high order by the management in both new and estab. plants. The study of the firm's operations, the use of electronic computers in providing better information, and the control of costs call for new techniques and changes in the structure of management. Automatic processes rest more on technical decisions than in the past. Thus it seems probable that scientists and technologists will rise more often to posts of higher management. So far as labour is concerned, there is a fear that A., which often reduces the need for operatives, will enable the demand for goods and services to be met with some workers unemployed. With full employment the danger need not become real, though there will be, as in the past, a steady movement of workers from one industry, occupation, or possibly one region to another. Much will depend on the rate at which firms introduce A.; experience has shown that the change need not be rapid. The demand for skilled labour is likely to be enlarged as A. develops. The present stage of mechanisation is sometimes regarded as still mainly opposed to the true interests of the worker, for his part in production can be so monotonous that he loses all interest in it. It has also been regarded as one of the fundamental causes of the split between thought and feeling so characteristic of the present age. But once workers cease to take an active part in the process as it becomes automatic, they are free to move at their own pace and so will probably find their work less irritating. They also benefit from the disappearance of heavy physical tasks and gain satisfaction from their new responsibilities and skills. On the other hand, they lose the close social contacts while at work which have often made the monotony of mass production bearable.

The prospect for A. is not altogether clear. But the present chain of technical developments is likely to stretch into the future and to have a considerable impact on many, though by no means all, industries in Britain. Like other advances in technique, A. will increase efficiency, reduce costs, and raise living standards. It will also help to keep the country's exports competitive. At the same time A. is likely to raise serious problems common to all forms of technical advance. These must be solved if industry is to absorb the new techniques without bad social effects. Attention will have to be given to the needs, feelings, and problems of the workers concerned.

Courses in higher technology which are concerned with one or more aspects of A. are being planned at technical colleges and other institutions throughout the country. These are mainly part-time and special courses offering facilities for students qualified and experienced in one of the fields to which A. can usefully be applied. There are also facilities for post-graduate training in research techniques at a number of univs. and univ. colleges. See MASS PRODUCTION IN THE U.S.A. See H.M.S.O., *Automation*, 1956; R. H. Macmillan, *Automation: Friend or Foe?*, 1956; Magnus Pyke, *Automation: Its Purpose and Future*, 1956; Paul Einzig, *Economic Consequences of Automation*, 1956.

Automatism, power of self-movement without external stimulus as exhibited in life of the cell or organism, and in the will of man. The term is also applied to the philosophical doctrine that all the actions of living beings, including man, are physiological in their origin, and are not the effect of volition, which is merely an accompaniment of the action.

Automaton, see AUTOMATION.

Automobile, see MOTOR CARS AND MOTOR CYCLES.

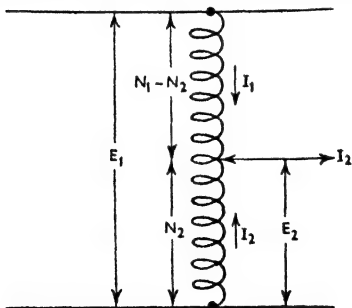
Autonomy, in its political sense denotes the polity of self-gov. or a self-governing community. Varying degrees of A. are exhibited by the Brit. colonies and dependencies. A more perfect instance is afforded by the powers of independent action of the anct Gk city communities. In Kant's philosophical use of the term it expresses the principle that no law without a moral foundation can be held as binding on the conscience.

Autoplasty (Gk *autos*, self; *plassein*, to form), repair of wounds or diseased parts by grafting tissues taken from other parts of the patient's body.

Autopsy, see POST-MORTEM.

Autosuggestion, see COUÉ; HYPNOTISM; PSYCHIATRY.

Autotransformer, single coil wound on an iron core and connected across the



alternating current supply through a switch. Supply at lower voltage is obtained by connection across one end and an intermediate point of the coil. If the total number of turns are N_1 ,

the turns in the tapped portion N_2 , the primary current I_1 , the secondary I_2 , the ampere turns in the top portion will be $(N_1 - N_2)I_1$, in the lower portion $N_2(I_2 - I_1)$, total $(N_1 - 2N_2)I_1 + N_2I_2$. In the ordinary transformer the total would be $N_1I_1 + N_2I_2$. The A. is thus more economical. By interchanging the primary and secondary connections a small step-up of voltage can be obtained.

Autran, Joseph (1813-77), Fr. poet and dramatist, b. Marseilles. He gained the Montyon prize of the Fr. Academy with his tragedy *La Fille d'Eschyle*, 1848, and was elected to the Academy in 1868. Amongst his vols. of verse are *La Mer*, 1835, *Milmanah*, 1842, *Epitres rustiques*, 1862, and *Sonnets capricieux*, 1873, all of which are distinguished by classical purity of form and beauty of rhythm.

Autrefois Acquit and Autrefois Convict, pleas by an accused person that he had been previously acquitted or convicted of the same crime of which he is now accused. The plea holds good only in cases of acquittal or conviction by a court of competent jurisdiction.

Autumn, third season of the year. It commences astronomically when the sun enters the sign of Libra, about 23 Sept., its declination being then zero, and ends when the sun has reached its greatest declination S., about 23 Dec., as it enters the sign of Capricornus. In the S. hemisphere it is reckoned from 21 Mar. to 22 June. See SEASONS.

Autun, Jehan d', see AUTHON.

Autun (anct *Augustodunum*). Fr. tn, cap. of an arron., in the dept of Saône-et-Loire, on the Arroux. As *Augustodunum* it was a prin. city of Rom. Gaul, famous for its school of rhetoric. Destroyed in 240 by Tetricus, and rebuilt by Constantine the Great, it was successively sacked by the Vandals (406), the Burgundians (414), the Huns (451), the Franks (534), the Arabs (739), the Normans (1095), the English (1379). It has Rom. remains, including a pyramid, a theatre, and 2 gates, and has a fine cathedral, mainly 12th cent., with a celebrated sculptured front of the Last Judgment. A. is still the seat of a bishopric. It has metallurgical, furniture, and shale-oil industries. Pop. 14,800.

Auvergne, anct prov. of France, corresponding to the present depts of Puy-de-Dôme and Cantal, and part of Haute-Loire. Upper A. is mountainous, with a climate subject to great extremes, while Lower A. is more level and contains some very fertile dists. There are rich mineral deposits in the mountainous region, which also contains many mineral springs. The name of the prov. is derived from that of the early inhab., the Arverni (see VERCINGETORIX). Part of the prov. was united to the Crown in 1527, and the rest in 1610.

Auvigny, Jean du Castro d' (1712-43), Fr. writer and soldier, killed at the battle of Dettingen. He wrote mostly in collaboration with the Abbé Desfontaines, his main works being *Mémoires de Madame de Barnevill*, 1732, *Histoire de la Ville de Paris*, 1735, and the first 8 vols. of *Vies des hommes illustres de la France*, 1739-57.

Aux Cayes, *see* CAYES, LES.

Auxerre (anc. Autissiodorum), Fr. tn, cap. of the dept of Yonne, on the Yonne. The fine Gothic cathedral is partly 13th cent., and the church of St-Germain has very anc. crypts, in which are paintings of the 9th and 10th cents. Paul Bert (q.v.) was b. here. A. is a mkt tn, and makes wines, ochre, and metal goods. Pop. 24,000.

Auxiliary Territorial Service, *see* WOMEN'S ROYAL ARMY CORPS.

Auxiliary Verbs are used with other verbs to help to form the voices, moods, or tenses of the latter. When so used they lose practically all their original signification. Such verbs are 'have,' 'may,' 'must,' etc., in English; 'haben,' 'werden,' in German; and 'être,' 'avoir,' in French.

Auximum, *see* OSIMO.

Auxonne, anc. Fr. fort. tn in the dept of Côte-d'Or, on the Saône. There is a noteworthy 14th-cent. Burgundian Gothic church. It has a market and steelworks. Pop. 5300.

Auzout, Adrien (1622-91), Fr. astronomer, b. Rouen. In collaboration with Picard he improved the micrometer for measuring the apparent diameters of the heavenly bodies by making use of silk fibres or silver wires. He was the author of *Traité du micromètre*, 1667, and *Lettres sur les grandes lunettes*.

Ava, ruined city of Burma, on the l. b. of the Irawadi, 6 m. SW. of Amarapura. From 1364 to 1740 it was the cap. of Burma, and again from 1822 to 1838. It was destroyed by an earthquake in 1839.

Ava, *see* DUFFERIN and AVA.

Avadavat, *see* AMADAVAT.

Avalanche (Fr. *avaluer*, to descend), mass of ice or snow, mixed sometimes with earth, which becomes loosened from a mt slope and dashes into the valleys, sometimes causing great destruction. There are various kinds—drift or powder A.s. composed of dry powdering snow, and blown into the valley like a cloud; A.s. caused by the melting of the snow in spring, in which case the ground itself becomes loose, and is swept down with trees and rocks; and ice A.s. consisting of frozen snow and ice, sweeping down from the glaciers, most frequently during the summer months.

Avalite, silicate found in green scales at the Mt Avala mines in Belgrade, where mercury is found.

Avalon (anc. Aballo), Fr. tn, cap. of an arron. in the dept of Yonne, on a promontory overlooking the R. Cousin. It is a mkt tn, has quarries, and makes wines. Pop. 5600.

Avalon, peninsula, Newfoundland, forming SE. portion of the is. In it stands the cap., St John's (q.v.).

Avalon (Apple-green Is.), paradise of Celtic mythology, Tennyson's 'island-valley of Avilion.' Some have thought to identify the A. of Arthurian legend with Glastonbury. A. contained a mystic fountain and the magic apples, and was the Vallhalla of the Celtic heroes.

Avalos, Fernando Francesco de, Marquis of Pescara, *see* PESCARA.

Avanturine, or **Aventurine**, glass-like variety of quartz, containing numerous spangles of brown mica. It is most common in the Ural Mts, but is also found in France, Spain, Austria, and India. There is also artificial A., known as 'goldstone,' consisting of glass into which red spangles of copper are introduced. A. is much used for the handles of umbrellas, brooches, etc.

Avanzi, Jacopo di Paolo d', It. painter of the 14th cent. He is supposed to have been a pupil of both Franco Bolognese and Vitale delle Madonne. Only a few of his works remain. He painted the frescoes of the chapel of San Felice, in the church of Sant' Antonio at Padua, 1376; frescoes in the old church of the Madonna di Mezzarata, with Simone da Bologna; 2 Triumphs in a public hall in Verona; and some work in the chapel of San Giorgio in the church of Sant' Antonio at Padua, with Aldighieri da Zevio. Two pictures in the gallery of Bologna are also attributed to him.

Avaticum, *see* BOURGEN.

Avaris, cap. of the Hyksos (q.v.) in the E. Delta of Egypt, later known as Tanis (q.v.). It was captured by Ahmes, the founder of the 18th dynasty.

Avars, warlike people of Turkic origin who settled on the steppes of the Don and in the neighbourhood of the Caucasus. They penetrated as far as Dacia and served in the army of the Emperor Justinian, AD 558. Later they took possession of Pannonia, and in 566 joined the Longobards against the Goths. From this time until the close of the first half of the 7th cent. they greatly extended their dominion over the Bulgarians and the Slav peoples of the Danube, until, in AD 640, they were driven out of Dalmatia. Their power was finally destroyed by Charlemagne in 796, and as a separate race they seem to have disappeared shortly afterwards.

Avatar (Sanskrit *avatāra*, descent), an incarnation and, more particularly, in Hindu mythology the descent of a deity to earth in a visible form. The 10 incarnations of Vishnu are notable A.s.

Avaugour, Pierre Dubois, Baron d' (d. 1664), Governor-General of Canada, 1661-3, previously Fr. ambassador in Sweden. He quarrelled with Bishop Laval over the question of the sale of brandy to the Indians. A. regarding the traffic as commercially beneficial to Canada, and especially to the fur traders; but Laval succeeded in getting him recalled. It was during A.'s tenure that Groseilliers and Radisson, Fr. fur traders, explored the country N. of Lake Superior, and in this matter, too, A. quarrelled, demanding part of the profits of the expedition. His report on Quebec shows that he was the first to point out the advisability of the French seizing Lake Champlain and the Hudson R. as far down as Manhattan, so as to possess an open-water harbour in the S. In his time, too, the Iroquois were subdued (*see* ARGENSON), the colony making good progress thereafter. A. was killed in Hungary in a campaign against the Turks.

Ave Maria, first 2 words of a Lat. prayer to the Virgin Mary used by Rom. Catholics. The first part is the salutation of the angel to Mary on her conception (Luke i. 28). The second part is an entreaty to the Virgin to pray for the salvation of sinners now and at the hour of death. The prayer usually follows the *Pater Noster* or Lord's Prayer.

Avebury, Sir John Lubbock, 1st Baron (1834-1913), politician and scientist, educ. at Eton. He was a Liberal M.P. (Liberal-Unionist from 1896), 1880-1900, when he was raised to the peerage. From 1890 to 1892 he was principal of the London Working Men's College, and vice-chancellor of London Univ., 1872-80. Among his many publs. on natural hist. were *Prehistoric Times*, 1865, *On Origin and Metamorphoses of Insects*, 1874, and *Notes on the Life History of British Flowering Plants*, 1905. A. is best known for his Bank Holidays Act, 1871.

Avebury, vil. and par. in Wilts, England, remarkable as the site of what appears to have been one of the largest pre-Celtic or Druidical temples in Europe. About 650 blocks of stone seem to have been placed in circles and rows. These stones, of which few remain, are of various sizes, from 5 to 20 ft high and 3 to 12 ft thick. There is a great variance of opinion as to the time when and the purpose for which this singular work was constructed, but it is thought that it was built over 3500 years ago, in the first phase of the Early Bronze Age. With its outer ring of massive stones enclosing over 28 ac., and its bank, $\frac{1}{2}$ m. in circumference, rising originally 50 ft above the bottom of the ditch, it is the most impressive of its kind in Europe, and the mightiest effort of prehistoric man. Yet for cents. this heritage was allowed to decay, and the megaliths were treated as quarries for building stone, while in the Middle Ages many were buried. Much is owed to the late Alexander Keiller, the owner of the site and director of the Morven Institute of Archaeological Research, for the work of preservation and restoration which was carried out in co-operation with the Ministry of Works. In 1925-1926 Keiller bought Windmill Hill (q.v.), 14 m. NW. of A., which hill, in his opinion, was of even greater significance than A. itself, and from 1929 he and his staff excavated the site. In 1938 the A. museum was opened in the 18th-cent. stables of the manor house. Previously, in 1935, the Office of Works first envisaged the preservation of A. and its surroundings in a planning scheme; but further anxieties for its preservation were set at rest in 1943, when the National Trust acquired 950 ac. of land at A. for the nation. The purchase from Keiller included the greater part of the group of prehistoric remains, the neolithic site of Windmill Hill, and the manor farm of 650 ac.

Aveiro: 1. Dist. of NW. Portugal, partly in Beira Litoral prov. and partly in Douro Litoral prov. (q.v.v.). It is on the Atlantic coast, is watered by the R. Vouga, and is mainly agric. Area 1070 sq. m.; pop. 477,200.

2. (Anct **Talabriga**), tn of Portugal, cap. of A. dist. It is on the Atlantic coast, on a salt lagoon (25 sq. m.), at the mouth of the Vouga. There is a cathedral, and there are fishing and salt industries, and a trade in agric. produce and wine. Pop. 13,000.

Avela, see AVILA.

Avellaneda, see FERNÁNDEZ DE AVELLANEDA.

Avellaneda, Nicolás (1830-85), Argentine statesman, b. Tucumán. His family were exiled from the country, but after the fall of Rosas in 1852 A. returned. He became a member of Congress in 1860, prof. of political economy in 1861, and was minister of public instruction in 1868. During his tenure of office the country made remarkable progress, and in 1874 he was elected president of the rep. He put down the insurrection of Mibie in 1875, and in the same year sent an expedition against the Indians. He was superseded in power by Gen. Roca on 12 Oct. 1880.

Avellaneda, manufacturing city, cap. of A. dist., on the R. Riachuelo, Argentina, named after Nicolás A. (q.v.). Important rail and industrial centre and chief industrial tn of Argentina. Pop. 100,000.

Avellino: 1. Prov. of Italy, in central Campania (q.v.). It is in the Apennines (q.v.), and has some high peaks in E. and S. There are sev. high riv. valleys; the chief rivs. are the Calore and Ofanto. The prin. tns include Avellino and Bisaccia (q.v.). Area 1104 sq. m.; pop. 500,000.

2. (Anct **Abellinum**), lt. tn, cap. of the prov. of Avellino, 28 m. ENE. of Naples (q.v.). It stands in the valley of the Sabato, has a cathedral (partly 10th cent.), and is an agric. centre. The trees of the dist. produce a nut, *nux Avellana*, which was esteemed by the Romans. Pop. 40,300.

Avempace, see IRN-BAJJA.

Avena, name of a genus of grasses which has deeply furrowed grains enclosed in glumes adherent to them. The genus contains 50 widely distributed species, of which the most important is the *A. sativa*, or oat.

Avenches, vil. of Switzerland situated in a detached part of the canton of Vaud. Known as Aventicum around 100 bc, it was then the cap. of the Helvetii (q.v.), with a pop. of 80,000. Later a Rom. colonial tn. It was sacked by the Huns in the year 451. Pop. 1600.

Avenio, see AVIGNON.

Avens, *Geum rivale*, water A., and *G. urbanum*, wood A., grow in woods and damp places of Britain. The mt A., or *Dryas octopetala*, is an Alpine shrub. All belong to the family Rosaceae.

Aventail: 1. Flap or movable visor of a helmet in old armour (q.v.).

2. Mail tippet hung from the lower edge of a helmet of the 14th cent., protecting the neck.

Aventine Hill, one of the 7 hills of Rome, included within the Servian Wall c. 280 bc. See ANCUS MARCIUS.

Aventinus (1477-1534), name used by Johann Thurmayer, author of the *Annales*

Boiorum (a hist. of Bavaria). He was a native of Abensberg, whose Lat. name he adopted. He has been called the Bavarian Herodotus, and was tutor to the sons of the Duke of Bavaria from 1509. His hist. was first pub. in 1554.

Aventurine, see AVANTURINE.

Avenzoar (Ibn Zohar, Abumeron) (1109?-1162), Arabian physician, b. Seville. His full name was Abu Merwan Mohamed ben Abdal-Malik Ibn Zohar. He was court physician to Ibrahim ben Yussuf ben Tashfin, the Almoravado sovereign of Morocco and Córdoba, and was the greatest physician of the W. Caliphate. He described the itch-mite, paralysis of the pharynx, mediastinal abscess, otitis media, and treatment of stone in the bladder. He was the first to attempt complete removal of the womb. He anticipated the modern stomach tube. His most important work was the *Teisir*, a treatise on clinical medicine, which was first printed in a Lat. trans. in 1490. See D. Campbell, *Arabian Medicine*, 1926.

Average: 1. In the science of numbers an A. is a sum or quantity intermediate to a number of sums or quantities, which is obtained by adding the sums or quantities together and dividing by the number; thus, if 5 sacks contain 6, 8, 11, 12, and 13 lb., the A. weight will be $\frac{6+8+11+12+13}{5} = \frac{50}{5} = 10$ lb. The A.

of such a kind is an arithmetical mean (see MEAN). But in ascertaining A.s which are to be of value for statistical or for other scientific purposes, such arithmetical A.s are not sufficient, and attention must be paid to the relative importance to each other of the quantities thus added together, and, as it is called by statisticians, the 'weighted' rather than the 'arithmetical' mean should be sought for. A simple example may be given. A offers to sell to B 3 plantations of trees, which he averages before counting the trees in each plantation at 2s. per tree for the first, 1s. 6d. for the second, and 1s. for the third. The arithmetical A. or mean price would be $\frac{4s. 6d.}{3} = 1s. 6d.$ On felling the trees in each plantation the numbers work out thus: 200 in the first, 100 in the second, 300 in the third; the weighted mean or A. will be then found by multiplying the number of trees in each plantation by the original price, adding the total, and dividing by the total number of trees; the weighted mean is then 1s. 5d.

2. Term used in shipping law in relation to loss of or damage to cargo or ships. It is of 2 kinds: (1) *General A.*, which connotes all loss which arises in consequence of extraordinary sacrifices made, or expenses incurred, for the preservation of the ship and cargo. In this case, if the sacrifice was incurred to avoid a danger common to all the interests, and was both real and voluntary, then the cargo-owner or shipowner who has sustained such loss or expense is entitled, provided the ship and cargo or some portion have actually been preserved, to be recouped his loss or part of it from the other interests in

the adventure. The question of general A., which is entirely in the hands of A. adjusters, is regulated for the most part by the York-Antwerp Rules of 1877 (as revised in 1890), and most Engr. contracts of carriage and marine insurance embody a reference to these rules. (2) *Particular A.* (so called) or 'partial loss.' This arises whenever damage is done to the goods or property of an individual by accident or otherwise, but the damage is not suffered for the general benefit, e.g. damage by water to cargo. See also CENSUS.

Averaging, operation on the stock exchange, by which a speculator increases his transactions at a higher or a lower figure when the market is going against him, so that the average price of the whole will be higher or lower than his original sale or purchase. Thus a 'bull' would purchase more stock and a 'bear' would sell more, as the price fell away or rose against him. A relatively smaller movement is thus necessary to ensure a profit.

Averdepois, see METROLOGY.

Averescu, Marshal Alexander (1858-1938), Rumanian soldier and Prime Minister, b. Ismail, Bessarabia. As war minister, 1907, he suppressed the peasant revolt; during the second Balkan War of 1913 he was chief of staff in the Rumanian invasion of Bulgaria. In the First World War he commanded the Rumanian army of the Danube in Transylvania and later held the supreme command in the Dobrudja. He strove to repel the Germano-Austrian advance under Gen. Mackensen, but had to fall back on Bucharest, which fell 7 Dec. 1916. He evacuated the Dobrudja Jan. 1917 and took up a new line on the Siret in defence of Moldavia, but on the defection of Russia (see BREST-LITOVSK, TREATY OF) was compelled to surrender unconditionally. After the war he founded the Popular party. He was Prime Minister in 1918, 1920-1, and 1926-7. Formed a political alliance in Rumania to oppose Prince Carol's return.

Averno, lake in Italy, about 2½ m. NW. of Pozzuoli (q.v.). Its classical name was Avornus (lik *aornus*, birdless). It is a circular sheet of water, about 1½ m. in circumference and of great depth. It is the crater of an extinct volcano, and its darkness and the noxious vapours, which were supposed at one time to have arisen from it, said to be fatal to birds, caused the anc. poets to refer to it as the entrance to the infernal regions. The lake, which is 213 ft deep and 3½ ft above sea-level, figured as the scene of many other legends cents. ago. It was supposed to be connected with the lower world, hence Virgil's 'Facilis descensus Averno.' In 214 bc Hannibal (q.v.) made a pilgrimage to it. Remains of baths are on the E. of the lake, including a lofty octagonal hall called the Temple of Apollo.

Avernus, see AVERNO.

Averrhoa, family Oxalidaceae, genus of 2 ornamental trees with alternate leaves, 5-parted flowers, and edible fruits; cultivated in India and China. *A. bilimbi*, the Blimbing, or Cucumber Tree, and *A.*

carambola, the Carambola Tree, have fruits with a pleasant acid juice, useful in preparing drinks and lemonades.

Averroës (Ibn-Rushd) (1126-98), Sp. philosopher of the Arabian school who wrote also on astronomy, medicine, and jurisprudence; b. Córdoba. The bulk of his work consists of commentaries upon Aristotle. These exercised no small influence upon medieval Aristotelian studies; and it is easy to detect in them the teaching of al-Farabi (q.v.) transmitted through Avempace and Abubacer (qq.v.). Chief among his independent philosophical treatises is *The Incoherence of the Incoherence*, written in reply to Qazali's *Incoherence of Philosophy*. A. upheld the primacy of reason, believing that the content of religious doctrine is merely a symbolic form of the truth discovered by philosophy. His theories tended to materialism and pantheism, and were condemned on their account by the univ. of Paris and later by the Holy See. The first complete ed. of his commentaries was pub. in Latin at Venice (1552), the *Incoherence* having been printed (also in a Lat. version) by Agostino Nifo in 1517. Of this latter work there is an Eng. trans. by S. van den Bergh, 1952. A. was the last of the great Arab physicians. His chief medical work was the *Kilab-al-Kulyat*, usually known as *Colliget* (Book of Universals). It was an attempt to found a system of medicine on the neo-Platonic modification of Aristotle's philosophy. It was first printed (in Latin) in 1482. See T. J. Boer, *The History of Philosophy in Islam*, 1903, and L. Gauthier, *Ibn Rushd-Averroës*, 1948.

Avers, valley in the canton of Grisons, Switzerland, adjoining the Hinter-Rhein valley. The lower portion, known as the Ferrera Glen, lying between Canicul and Cresta, is said to be the highest inhabited place in Europe (6394 ft.).

Aversa, It. tn, in Campania (q.v.), 8 m. N. of Naples (q.v.). It was the first place in Italy in which the Normans (q.v.) settled (1029). There is a cathedral (12th-18th cents.), and sev. notable churches. A. is an agric. centre, and has soap manufs. Pop. 35,900.

Avèsnès, Fr. tn in the dept of Nord, cap. of an arron. It has anct fortifications and a 13th-16th cent. church. There are wool and linen manufs., and cheese (Marolles) is made. Pop. 5200.

Avesta, The, 'Scripture' (mistakenly called sometimes the *Zend Avesta*, *Zend* meaning commentary), sacred writings of anct Iran and of Zoroastrianism and the Parsees (qq.v.). Originally far more voluminous, they were depleted by the ravages of Alexander the Great (350 bc) and by the Muslim invasions of the 7th cent. which drove the remaining faithful away to India, where they now survive. The few MSS. that they were able to carry with them form the A. as we have it. Its original language is akin to Sanscrit, and called Avestan, though written in the script of the old Persian vernacular, Pahlavi, into which the A. has also been trans., as well as into Sanscrit. The most anct part of the A. undoubtedly consists

of the *Gathas*, metrical prophecies probably composed by Zoroaster himself, and representing his teaching in its purest and most lofty form.

Aveyron, dept of S. France, formed of part of the anct prov. of Guyenne. It is mountainous, and is watered by the Lot, Tarn, and Aveyron. In the N. are spurs of the Cantal Mts, and in the S. are spurs of the Cévennes. Owing to the nature of the ground the prin. agric. industry is stock rearing, but some cereals, vines, tobacco, and fruit trees are cultivated. Coal, iron, and other minerals are mined. There are textile, iron, and cheese manufs., and hydro-electric installations. The prin. tns are Rodez (the cap.), Millau, and Villefranche-de-Rouergue (qq.v.). Area 3386 sq. m.; pop. 292,700.

Avezzano, It. tn, in Abruzzi e Molise, 22 m. S. of L'Aquila (q.v.). It is built on the drained lake of Fucino (q.v.), and was badly damaged in an earthquake in 1915, and again in the Second World War. Pop. 17,000.

Avogustov, see AUGUSTÓV.

Aviano, It. tn, in Friuli-Venezia Giulia (q.v.), 30 m. W. of Udine (q.v.). Pop. 6600.

Avianus, Flavius (fl. c. AD 400), Lat. writer of fables. He seems to have lived at Rome. His fables are 42 in number, and resemble those of Macrobius. They were dedicated to one Macrobius Theodosius. See the Prolegomena to the ed. of R. Ellis, 1887.

Aviation, heavier-than-air flight. See AERONAUTICS and the cross-references there.

Aviation, Civil or Commercial. Civil A. received a great impetus from the First World War through the accelerated development of aeroplanes and the ever-increasing number of aviators. During the actual period of the war, civil A. was of course restricted, but when in 1919 it was possible to remove the restrictions, commercial services and experimentation again went ahead. During the war the Air Council were invited by the gov. to consider the development and regulation of civil aerial transport from the international standpoint. The Council, through special committees, investigated questions of law and policy; technical and practical questions as to the powers of aircraft and the requirements of aerial service; commercial outlook of the aircraft manufacturing industry; labour questions; and scientific research. (See *Reports of The Civil Aerial Transport Committee*, 1918. Cd. 9218.) An International Air Convention was signed in 1919 by all allied and associated powers (and, later, a number of other nations subscribed to it), the chief value of which was in co-ordinating the regulations for air traffic. Subsidies, long-distance demonstration flights, and foreign missions were among the methods used by various states to encourage civil A. and to secure public confidence in its future. In 1919 (Aug.) the first regular commercial service between London and Paris was estab. by the Handley Page Company. A mail air service was instituted with Belgium

during the same month. By the end of that year not far short of 1000 passengers were carried on the London-Paris route and about £100,000 worth of goods over the routes to France and Belgium. Before the end of 1920 at least 100 aerodromes had been licensed by the gov., the first customs aerodrome being at Hounslow, others being organised at Cricklewood, Felixstowe, and Lymington. The Hounslow aerodrome was eventually removed to Croydon, which became the metropolitan terminus of commercial and civil flying from and to England, until London Airport came into use in 1946.

At first most air services were operated by private companies, but it soon became apparent that some form of official assistance or subsidy would be needed to keep the companies solvent. In many countries the prin. air carriers were eventually nationalised. In others, notably the U.S.A., assistance took the form of extensive subsidies for carrying air mail.

The first major advance in Britain came in 1924, when sev. private companies were amalgamated in the gov.-subsidised Imperial Airways. This company operated regular daily services in Europe from London to Paris, Brussels, and Cologne and, at certain seasons, Basel, Le Touquet, and Zürich. It had (1939) 8 weekly services to Egypt and back, 5 to India, 3 to Singapore and Central Africa, and 3 to Sydney via Egypt, Palestine, India, Burma, and Malaya. There was a weekly service between Khartoum and Lagos and a weekly service between New York and Bermuda; besides numerous other services and connections. In 1924-5 the company flew 11,395 passengers, 212,380 letters, and the aggregate m. flown were 853,042; by 1932-3 the totals were 58,060 passengers, 11,400,000 letters, 2,351,176 m.; by 1936-1937, 64,771 passengers, 35,668,430 letters, 5,231,655 m. The Atlantic air route was subsequently pioneered by Imperial Airways in collaboration with Pan-Am. Airways. The second major Brit. pre-war air transport company was Brit. Airways, which operated services from Heston to Hamburg, Copenhagen, and Stockholm; Heston to Paris; Croydon to Berlin; Croydon to Hanover. Like Imperial Airways the company was given financial assistance by the gov. for developing Brit. air routes overseas. It was the first Brit. air-line company to operate regular night services. The Cadman Committee, in 1938, recommended that Brit. Airways should be entrusted with the development of European services other than those on the London-Paris route, which were to be operated by a new company combining the interests of Brit. Airways and Imperial Airways. The gov. also chose this company to operate the England-S. America air route via the W. coast of Africa. A number of 250-m.p.h. Lockheed 14 airliners were ordered for the inauguration of a regular passenger and mail service to Lisbon along this section. The night mail services of Brit. Airways were operated from Croydon; all other services of the

company were operated from their terminal airport at Heston, to which the company's fleet and maintenance organisation were transferred from Croydon and Gatwick in 1938. Under a Bill introduced in 1939 the undertakings of Imperial Airways and Brit. Airways were transferred to a new State-guaranteed corporation, the Brit. Overseas Airways Corporation.

British civil airways during and after the Second World War. The war, perforce, gave a great impetus to air travel by civilians, not only by reason of the striking advances in aircraft development but because sea travel was too hazardous and shipping scarce. During the war little could be achieved, but in Oct. 1944 the Ministry of Civil A. was instituted to take over the functions of the secretary of state in relation to B.O.A.C. and deal with aerial transport generally, both home and overseas, and also with civil research and production. Early in 1945 the Brit. Gov. proposed to set up 3 separate corporations for the empire, Europe, and Lat. America, with directorates appointed by the Ministry of Civil A. and linked together not only by the participation of B.O.A.C. in all 3, but also by a common organisation in the overhaul of aircraft and a common school for the training of crews and technicians. Accordingly shortly after the war 2 new corporations were formed—Brit. European Airways and Brit. S. Amer. Airways. Railway companies and shipping firms were excluded from any participation in the ownership of the new corporations for those regions, though they put their experience and preliminary organisation at the disposal of the gov. At a conference in Bermuda (Feb. 1946) arrangements were made for the co-operation of the Brit. and Amer. Govs. in their common aim, defined as 'the widest possible distribution of the benefits of air travel for the general good of mankind at the cheapest rates consistent with sound economic principles,' and the conflicting principles of policy mentioned above were harmonised by the expedient of working on a schedule of international routes of interest to both govts. In 1946 B.O.A.C. announced its 6 main services—the Kangaroo to India, Australia, and New Zealand; the Tiger to the Middle E. and S. Africa; the Dragon to the Far E.; a W. African service; and a double N. Atlantic service to Montreal and New York. European routes were taken over by Brit. European Airways (B.E.A.), and S. Amer. services by Brit. S. Amer. Airways, which was subsequently merged with B.O.A.C. Eventually, independent companies were allowed to offer certain classes of service, and to-day they are responsible for cheap-fare 'colonial coach' and inclusive tour services, vehicle ferry services, and much troop-carrying under gov. contract.

All over the world, civil A. has grown at a tremendous rate, and in 1956 there were approximately 275 air-lines operating scheduled services throughout the world, plus a large number of charter companies. Excluding the air-lines of Russia and China, for which no statistics are available,

they carried a total of some 78 million passengers, of which approximately three-quarters were flown by the 74 major airlines belonging to the International Air Transport Association (the I.A.T.A., which controls fares, to prevent price-cutting, and which has been responsible for such developments as 'tourist' class fares, which have done much to popularise air travel). These I.A.T.A. members owned a total of 2580 aircraft in 1955 and gave employment to 274,000 persons. On a gov. level, the International Civil A. Organisation (I.C.A.O.) is responsible for co-ordinating civil A. development throughout most of the world.

Although it does not rank first in the number of aircraft movements, London Airport is the world's busiest in terms of international traffic, with air-lines of 29 overseas countries flying to it on scheduled services. They include Pakistan International Airlines, Trans-Canada Air Lines, Transportes Aereos Portugueses, Luft-hansa (Germany), Iberia Sp. Airlines, Aer Lingus (Ireland), Air France, Swissair, Alitalia (Italy), Scandinavian Airlines System, Aerolineas Argentinas, Pan-Amer. World Airways and Trans-World Airlines (U.S.A.), Sabena Belgian World Airlines, Middle E. Airlines (Lebanon), Finnair (Finland), K.L.M. Dutch Airlines, Panair do Brasil, Olympic Airlines (Greece), Icelandair and Loftleidir (Iceland), Qantas Empire Airways (Australia), Central African Airways, Jugoslovenski Aerotransport, Air Ceylon, Air-India International, Iraqi Airways, S. African Airways, and El Al Israel Airlines.

See also ATLANTIC FLIGHTS.

Aviation Spirit, see PETROL.

Avicenna, see IBN-GABIROL.

Avicenna (Ibn Sina) (980-1037), Arabian physician, philosopher, scientist, poet, and statesman, *b.* Afshena, Persia. His phenomenal memory and lively intelligence made him a prodigy of learning and at the age of 18 he was appointed vizier to the Prince of Hamadan. At 21 he had compiled an encyclopaedia of all the sciences except mathematics. He is said to have composed some of the quatrains in the *Rubaiyat* ascribed to Omar Khayyam. Over 100 books were written by A. His philosophical works placed him among the greatest of the Arabic philosophers. His prin. work in this sphere is the *Recovery* (of the mind from ignorance), a collection of treatises on logic, physics, mathematics, and metaphysics. His mathematical writings were striking and original. Overshadowing all these was his *Canon of Medicine*, the most famous medical text ever written, in which he attempted to codify all medical knowledge. It contained over a million words and was still a required text-book at Vienna Univ. 500 years after it was written. It showed him to be an experienced and skilful practitioner; he was called 'the prince of physicians.' The *Canon* was trans. into Latin by Gerard of Cremona in the 12th cent.; 15 Latin and 1 Heb. eds. were printed before 1500; an Eng. trans. of Book I, by O. C. Gruner, was pub. in 1930. In 1024 A. became

physician and literary adviser to the emir of Hamadan, where he *d.* after 13 years of concentrated work interrupted by periods of physical dissipation. See C. des Vaux, *Avicenna*, 1926; C. Elgood, *Medical History of Persia*, 1951; F. Rahman, *Avicenna's Psychology*, 1951; L. Gaudet, *La Pensée Religieuse d'Avicenna*, 1951; G. M. Wickens (ed.), *Avicenna: Scientist and Philosopher*, 1952.

Avicennia, genus of tropical plants of the order Verbenaceae. *A. tomentosa* is the white mangrove, used in Rio de Janeiro for tanning; *A. resinifera* is a native of New Zealand; *A. nitida* grows in Martinique.

Avicula, name given to a genus of marine bivalves of the class Pelecypoda, with pearly shells. It derives its name ('little bird') from the wing-like expansions of the hinge which occur in typical species. It is allied to the pearl oysters, and in some classifications includes them.

Avienus, Rufus Festus (4th cent. AD), Lat. poet, *b.* Vulsinii in Etruria. The only knowledge of his life that we have is derived from an inscription, printed in Meyer's *Anthologia Latina*, which is supposed to refer to him. He wrote on geographical and astronomical subjects, chiefly in hexameters, the latter including a trans. of Aratus's *Phaenomena*. He is supposed to be the Festus who was proconsul in Africa in 366, and in Achaia in 372. See the ed. of A. Holder (1887).

Avifauna, collective term applied to the various kinds of birds found in any country or dist.; the fauna as regards the birds of that region.

Avigliano, It. tn, in Basilicata (q.v.), 8 m. NNW. of Potenza (q.v.). It manufs. explosives, and is an agric. market. Pop. 18,000.

Avignon (anc. **Avenio**), historic Fr. city in Provence (q.v.), on the Rhône (q.v.), cap. of the dept. of Vaucluse. Although dating from Rom. times it did not rise to importance until the Middle Ages. In the 12th and 13th cents. it was a rep., but subject to the Counts of Provence. In 1226 it was besieged by Louis VIII during the crusade against the Albigenses (q.v.). From 1309 until 1377 A. was the residence of the popes (see PAPAcy) and the prosperity of the tn dates from this time. The Fr. antipopes (q.v.) also used A. as their seat (1378-1408). From 1411 to 1790 the tn was administered by ecclies. legates (see COMPTAT VENAISIN). The high, crenellated ramparts, dating from the 14th cent., still exist; on the N. side, however, is the *Rocher des Doms*, now a public garden, rising steeply from the riv. The famous 12th-cent. Saint-Bénézet bridge, immortalised in the folk-song 'Sur le Pont d'Avignon', has been in ruins since 1669. It is flanked by a Romanesque chapel (1234-7). The archiepiscopal cathedral (12th-17th cents.) stands beside the enormous fortress-palace of the popes, one of the most magnificent Gothic buildings of the 14th cent. There are many other fine medieval and Renaissance buildings, and there are Rom. remains and notable museums. The tn is much visited

by tourists, and it has silk, wine, ochre, machinery, and oil industries. Pop. 62,800.

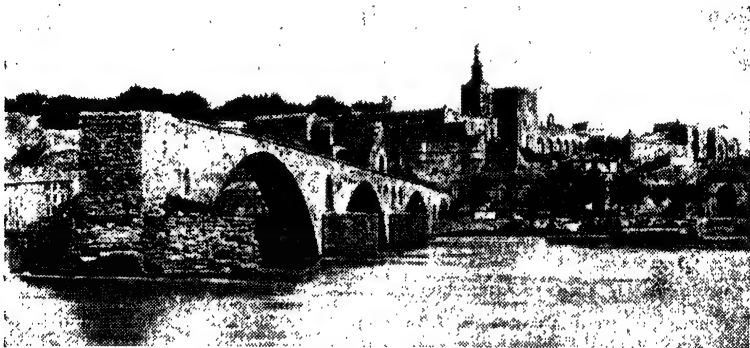
Avila: 1. Sp. prov., in Castilla la Vieja (q.v.). It is mountainous, with fertile valleys. The prin. industry is stock-raising, and timber, cereals, olives, and chestnuts are produced. Area 3107 sq. m.; pop. 255,300.

2. (Anct Avela), Sp. tn, cap. of the prov. of Avila. It is 3609 ft above sea-level, and is enclosed on 3 sides by mts. The old part is surrounded by massive 12th-cent. walls, into which is built the fortress-like cathedral. There are numerous other fine old buildings, including a

having been ambas. at the court of Theodoric, King of the Visigoths, he became Emperor of the W. in AD 455 on the death of Maximus. He was, however, deposed the following year.

Aviz (Avis), tn of Portugal, in Portalegre dist., 29 m. SW. of Portalegre (q.v.). It gave its name to a royal dynasty, beginning with John I (q.v.), and to an order of knighthood. Pop. 1500.

Avizandum, Scottish legal term. When the judge, after hearing a case, temporarily withdraws it for private consideration, or for some other reason, he is said to withdraw it *ad A.* In England he would be said to reserve judgment.



AVIGNON

E.N.A.

The cathedral and palace of the popes with the Pont Saint-Bénézet—"le pont d'Avignon."

Moorish castle, and there was once a univ. (1504-1807). St Teresa (q.v.) of Jesus was b. here. Pop. 25,000.

Avilés (anct Flavionavia), Sp. tn in the prov. of Oviedo. There are coal and copper mines near by, and textiles and pottery are manuf. Pop. 18,000.

Avilia, Beato Juan de (1500-69), Sp. religious writer, b. Almodóvar del Campo. After studying at the univ. of Salamanca and Alcalá, he took holy orders, and settled in Andalusia. His prin. writings are *Audi filia* (1556-7), a vigorous work preaching Christian asceticism, and his famous correspondence *Epistolario espiritual*. He was beatified in 1894. See P. Gerardo de San Juan, *Vida del Maestro Juan de Avilia*, 1915.

Aviz, see AVIZ.

Avison, Charles (1709-70), musical composer, b. Newcastle on Tyne. He studied under Geminiani, and pub. numerous concertos, a few of which have been repub. in recent times, and many sonatas. He also wrote well on music, and his *Essay on Musical Expression*, 1752, is the first Eng. musical criticism.

Avitus, Marcus Maecilius (d. 456), Rom. emperor, a native of Auvergne. He was prefect of Gaul, and waged successful war against the Huns and the Vandals. After

Avksent'yev, Nikolay Dmitriyevich (1878-1943), Russian politician, leader of the right wing of the Socialist Revolutionaries (q.v.). In 1917, after the Feb. Revolution (q.v.), he became Chairman of the Soviet Peasants' Deputies, then Minister of the Interior in the Provisional Gov. (q.v.), and Chairman of the Pre-Parliament (q.v.). In 1918 he was a member of the Ufa Directory (q.v.). Later he lived in emigration.

Avlona or **Valona** (Albanian, *Vlonë*), tn and seaport of Albania on the bay of Janina, 58 m. S. of Durazzo (Durrës). It was under the gov. of Venice until 1691. There is a good harbour, and wool and tortoise-shell were formerly exported from A. in quantity. The dist. produces natural asphalt, salt, tobacco, oils, and alcohol. There is an oil pipe-line from the interior. It demands on Austria-Hungary, as formulated in April 1915, included recognition of her sovereignty over A. At the same time Italy was signing a secret agreement with the Allies whereby, *inter alia*, she was to annex A. and its neighbourhood. In Dec. 1915 the Italians occupied A., which was thus secured as a base to dominate all the S.-central part of Albania. After the downfall of Italy in the Second World

War, A. reverted to Albania and is now known as Vlone. Pop. 9100.

Avoca, or **Ovoca**, short riv. of co. Wicklow, Rep. of I., formed by the junction of the Avonmore and Avonbeg streams. It runs through exquisite scenery the 'sweet vale' of Thomas Moore's *Meeting of the Waters*. There are copper and lead mines.

Avocado Pear is the edible fruit of *Persea gratissima*, a species of Lauraceae, which grows in the tropics. It is also known as the alligator pear.



AVOCET

Avocet is the name of a widely distributed wading bird belonging to the genus *Recurvirostra*, characterised by its curious curved beak. The common A. bred in England till 1824, but then disappeared from England until 1947 when one bird returned and reared a family of 14 near Great Yarmouth. The genus is related to the snipe family and inhabits fen areas. It is found in Europe, Africa, and Central and S. Asia.

Avogadro, Count Amedeo (1776-1856), It. physicist, b. Turin, was made prof. of physics at Vercelli in 1809, and of mathematics at Turin in 1820. He enunciated in 1811 the hypothesis named after him: that equal vols. of gases at the same temp. and pressure contain equal numbers of molecules. This hypothesis is an important part of the atomic theory (q.v.).

Avoudupois (Averdepois), see METROLOGY.

Avola, seaport in Sicily (q.v.), on the E. coast, 14 m. SW. of Syracuse (q.v.). It has fine 18th-cent. buildings, tunny fisheries, and a trade in almonds, wine, and sugar. Pop. 22,000.

Avon, Celtic word meaning riv., the name of many Brit. streams, of which the following are the chief:

1. The Upper or Warwickshire A. rises near Naseby in Northants, and flows through Warwickshire and Worcs into the Severn.

2. The Lower or Bristol A., 70 m. long enters the Bristol Channel 6 m. below

Bristol. It is noted for its very high spring tides, which sometimes reach a height of 40 ft.

3. The eastern A. flows through Wilts and is navigable to Salisbury. It has a length of 50 m., and is noted for the delicate loach.

There are also 3 A.s in Scotland, tribs. of the Spey, the Clyde, and the Forth, and 2 in Wales, which flow into Swansea Bay.

Avondale, par. of W. Lanarkshire, Scotland, 7 m. SW. of Hamilton, famous as the scene of the battle of Drumclog (q.v.), 1679. Pop. 6000.

Avonmore, see AVOCA.

Avonmouth, suburb of the city and co. of Bristol (q.v.), Glos, England, at the mouth of the R. Avon, a fast developing port with extensive docks.

Avory, Sir Horace Edmund (1851-1935), Judge, b. London; educ. at King's College and Cambridge Univ. Called to the Bar, 1875; junior counsel to Treasury, 1889; senior, 1899. K.C. 1901. Appointed a Judge of King's Bench Div., 1910. He was generally accounted the ablest criminal lawyer of his day, and had the reputation of being an extremely stern judge but absolutely fair. It fell to his lot to try most of the worst criminals of his time—murder cases tried by him included those of Mahon, Vaquier, Brown and Kennedy, Field and Gray, Allaway, and Voisin. The Hatry case was also heard by A., and he presided over the trial of Lord Kylsant. As Crown counsel he prosecuted Adolf Beck, and it seems that the miscarriage of justice in that *cause célèbre* which led ultimately to the institution of the Court of Criminal Appeal (q.v.) was due chiefly to his scrupulous wish that the laws of evidence should be observed. See Gordon Lang, *Mr Justice Avory*, 1935.

Avranches, Fr. tn in the dept of La Manche, on a hill overlooking the estuary of the R. Sée. It was the seat of a bishopric from the 6th cent. until 1801. The cathedral, once considered the finest in Normandy, was demolished as insecure in 1790. In it Henry II of England received absolution for the murder of Becket. Horse-breeding, leatherwork, and fishing are the main industries. A. was the scene of decisive engagements during the Normandy campaign in the Second World War. Pop. 7500. See also WESTERN FRONT IN SECOND WORLD WAR, *Invasion of Normandy*.

Awaji, is. of Japan, in the strait at the E. entrance of the Inland Sea between Honshu and Shikoku. Much visited by tourists for its beautiful scenery. Length 30 m.; area 218 sq. m.; chief city, Sumoto; pop. 38,000.

Award, decision of an umpire in a submission to arbitration (q.v.). To be enforceable, the A. must determine all the differences at issue and no others.

Awash, riv. flowing SE. of Addis Ababa, cap. of Ethiopia, rising 20 m. W. of Addis Alam, and after a course of some 500 m. entering Lake Abbé. A hydro-electric scheme is in course of construction (1957) and is being financed by It. reparations.

When completed it will serve Addis Ababa with electricity.

Awe, loch and riv. in Argyll, Scotland. The loch is 23 m. long and 118 ft above sea level (greatest depth 307 ft), and is fed at the NE. end by the Orchy and Strae. On a peninsula (at high water an is.) stands Kilchurn Castle whose keep dates from 1440. The R. A. issues from the NW. end of the loch and flows through the Pass of Brander for about 5 m. into Loch Etive. It is an excellent salmon and trout stream; above it rise the 8 peaks of Ben Cruachan (3689 ft).

Awn, stiff, bristle-like projection from the glumes of many grasses, some fruits, and sometimes from leaf-tips or sepals.

Awomori, or **Aomori**, seaport of Japan and chief tn of the dept of A., on N. coast of Nippon, 444 m. N. of Tokyo. It has a fine natural harbour, and a large trade, mainly coal. Pop. 77,100.

Axbridge, par. and small tn of Somerset, England, 9½ m. W. of Wells, once a chartered bor. and now the centre of a rural dist. Pop. 1100.

Axe: 1. Riv. of Dorset and Devon, England, about 21 m. long, flowing through Axminster into the Eng. Channel at Lyme Bay. Not navigable.

2. Riv. of Somerset, England, about 25 m. long, rising in the Mendips and entering the Bristol Channel.

Axel, Dan. statesman, *see* ABSALON.

Axenberg, mt in the canton of Uri, Switzerland, to the SE. of Lake Luzern. Altitude 3670 ft. On a ledge of rock at its foot stands Tell's chapel (*see* TELL). The road called the Axenstrasse has been hewn out of the rock, and the mt is pierced by a tunnel on the St Gotthard railway.

Axestone, *see* JADE.

Axholme, Isle of, lowlying dist. of NW. Lincs, England, cut off by the Rs. Trent, Idle, and Don. Area 47,000 ac. It was probably originally covered with forest, and when this was destroyed, became a swamp, drained 1625-30 by Cornelius Vermuyden. There are still traces among the inhab. of the Flem. settlement at this time. Chief tns, Crowle and Epworth.

Axil, in botany, the upper angle between a leaf and the stem or branch from which it grows. Lateral buds usually grow out from the A., and are accordingly called axillary buds.

Axilla, anatomical term for the armpit, or pyramidal space between the inner side of the upper arm and the wall of the chest. The apex of the cavity points upward and inward towards the root of the neck, and its extent depends on the position of the arm, being greatest when it hangs at the side. When the arm is raised, the fore and hind boundaries form the axillary folds. The skin of the A. is dark and covered with large sweat-glands and hair. Large nerves and vessels of the arm pass through it, and there are numerous lymphatic glands into which drain the lymph channels from the arm, part of the breast, and part of the chest wall.

Axinite, name of a mineral which is a silicate of aluminium, lime, etc., with boracic acid, containing varying amounts

of iron and manganese. It derives its name from the fact that the edges of its glassy triclinic crystals bear some resemblance to the edges of an axe.

Axiom, self-evident proposition which may be taken for granted and requires no proof. The use of the word is now practically restricted to the general premises on which the truths of geometry rest. The term was so employed by Euclid, following Aristotle. Plato limited it to specifically geometrical truths.

Axis: 1. Rod or an imaginary line about which a body rotates, or is symmetrically disposed. The term has many special meanings in the various sciences. It is of frequent use in geometry, e.g. the A. of symmetry is the line joining corresponding points in symmetric figures; the A. of a solid is the line about which its angles are symmetrically disposed; the transverse A. of a conic passes through its foci; and there are similar uses in geometric crystallography and physics. In mechanics the term axle has the same meaning. As an anatomical term it denotes the second cervical vertebra, which supports the atlas.

2. In botany, term which is applied to the root and stem of the whole plant. When a seed has begun to germinate the plumule ascends into the air above the ground, while the radicle descends into the earth. The former is said to be the ascending A. of the plant, the latter the descending A., and around these axes of growth all other parts of the plant are arranged.

3. *Rome-Berlin A.*, the political and, later, military entente between Hitler and Mussolini, concluded, ostensibly, to present a common front against Bolshevism, but really as an essential factor in the formulation of a common policy against the W. democracies in order to secure the nullification of the treaty of Versailles. In Aug. 1937 Mussolini, speaking at Palermo, said: 'Another reality of which account must be taken is that which is now commonly known as the Rome-Berlin A. One does not reach Rome by ignoring Berlin, and one does not reach Berlin by ignoring Rome. There is an active solidarity between the 2 regimes. Let it be said in the most categorical manner that we will not tolerate in the Mediterranean Bolshevism or anything of a similar nature.' The term A. became a common description for the countries allied to Germany in the Second World War. Japan and the Ger. satellites subsequently joined the A. formally. *See further under* EUROPE; GERMANY, *History*; ITALY, *History*; JAPAN, *History*.

Axis Deer (*Axis axis*), species found in India and the E. Indies, somewhat resembling the common European fallow-deer, being profusely spotted with white on a fawn background, shading from almost black on the back to white on the under-parts. It is easily domesticated.

Axius, riv. of Macedonia, which rises in Yugoslavia, and runs SE. through Skopje into the Gulf of Salonika. It was called Bardarian in the Middle Ages, and the modern name, Vardar, is a

corruption of this. In the upper part of its course it runs through narrow valleys between high mts. At its mouth alluvial deposits have made great encroachments, and the land is low and swampy, intersected with small creeks. It is constantly changing course to the southward. The entrance is very intricate, but the riv. is navigable for boats of 30 tons for sev. m. The depth of the riv. depends on the season of the year. It is as low as 4 ft in summer, but in winter it is deep and rapid, and nearly 2 m. in breadth before reaching the sea.

Ax-les-Thermes, Fr. spa in the dept of Ariège, on the Ariège. It is a centre for winter sports. There is a road from A. over the Pyrenees into Andorra and Spain. Pop. 1500.

Axminster, urb. dist. of Devon, England, on R. Axe, 24 m. E. of Exeter, at the intersection of two anc. roads, Icknield Way and Fosse Way. It was long celebrated for its carpets, the manuf. of which was begun in 1755. The industry is now carried on at Wilton. The minster from which it takes its name was founded in the 13th cent. and varies from Norman to Perpendicular in style. Pop. 2330.

Axolotl, larval salamander of the genus *Amblystoma*, found in lakes in Mexico and the Rockies. It resembles a newt in shape, having a powerful tail, 2 pairs of weak limbs, and 3 pairs of simple external gills. In this form it breeds freely, laying eggs like a frog's, in strings attached to water-plants by a viscous substance, and the young, hatched in 2 to 3 weeks, resemble the parents. This was originally supposed to be the life hist. of the species, but from 1865 onwards experiments showed that this form is prematurely sexual, and that the *Amblystoma* is capable of attaining an adult form in which gills and the tail-membrane are lost. The offspring of these, the full A.s are gilled. Some kinds of the species never appear to make this change, which can be favoured or prevented by the conditions of life.

Axona, see AISNE.

Axum, see AHSUM.

Ay, Fr. tn in the dept of Marne, on the R. Marne, 14 m. S. of Rheims. It is a centre for wines, especially champagne. Pop. 6300.

Ayacucho: 1. Dept of S. Peru. It is watered by the Apurimac. There is much agriculture and raising of livestock, and precious metals are mined. Area 18,190 sq. m.; pop. 304,200.

2. Cap. of dept of same name. 220 m. SE. of Lima. Pop. 18,300. It was founded by Pizarro in 1539, and the name, originally Huamanga, was changed to A. in commemoration of the resounding victory gained at a small place of that name over the Spaniards in Dec. 1824, which confirmed Peruvian independence, and finally ended Sp. power in S. America.

Ayala, **Adelardo López de** (1828-79), Sp. dramatist and politician. He was president of the chamber under Alfonso XII, but his political life was marked by confusing changes of opinions. His chief

dramas are *El tanto por ciento*, 1860; *El nuevo Don Juan*, 1863; *Consuelo*, 1878.

Ayala, **Balthazar** (1548-84), jurist, son of Don Diego de A., of Burgos in Spain, and of his wife, daughter of an alderman of Antwerp, where Balthazar was b. He was made 'auditor' or judge-advocate of the troops of Philip II in the United Provs., in May 1580. In 1583 he became also member of the great council and master of requests in ordinary. The only work he pub. was *De Jure et Officiis et Disciplina Militari*, libri iii., 8vo, Douai, 1582. An Eng. trans. has fairly recently appeared in America.

Ayala, **Pero López de** (1332-1407), Sp. poet and historian, b. Vitoria. He became Chancellor of Castile in 1399. His chief work is a chronicle of his own period, giving a vivid and objective picture of those cruel and stormy times.



ATE-AYE

He composed besides a somewhat dull poem *El Rimado de Palacio*, satirising contemporary society. He also pub. trans. of Boccaccio, Boethius, and Livy.

Ayala, **Ramón Pérez de** (1880-), Sp. poet, critic, and novelist, b. Oviedo, Asturias. He studied law at Oviedo, and travelled widely. He wrote autobiographical novels, *Tinieblas en las Cumbres*, 1907, *A.M.D.G.*, 1910, *La Pata de la Raposa*, 1912, and *Troteras y Danzadoras*, 1913. In 1921 he pub. a very popular and humorous novel called *Belarmino y Apolonio*, about 2 cobblers, one with an artistic and the other with a philosophic ideal. He is essentially an intellectual; his writings are characterized by subtle observation, a sceptical humour and a sincere interest in human problems. Many of his works have been trans. into English. See C. Claveria, *Cinco estudios*, 1945.

Ayamonte, Sp. fishing port in the prov. of Huelva, on the Mediterranean at the mouth of the Guadiana (q.v.). It is on the Portuguese frontier. There are cod, sardine, and tunny fisheries. Pop. 12,500.

Aydın, an il of Turkey SE. of Izmir and the most important area for the production of olive oil. Pop. 415,352.

Aye-aye (*Chiromys madagascariensis*),

rare and remarkable animal found in the woods of Madagascar. The memoir of Sir Richard Owen, 1863, made it clear that it is really an aberrant lemur with many rodent affinities. It is the size of a cat, has rodent-like teeth, and a hairy hand with an exceedingly slender third finger, which is used to pick out the wood grubs on which it feeds. It is exclusively nocturnal and arboreal in its habits, and is regarded with superstitious reverence by the natives of Madagascar.

Ayenbite of Inwit (Remorse of Conscience), prose trans. of a popular Fr. treatise, *Somme des Vices et des Vertus*. Written about 1340 by an Augustinian monk, Dan Michel of Northgate, Canterbury, it is mainly of philological interest as an example of Kentish dialect.

Ayer, Alfred Jules (1910-), Brit. philosopher, educ. at Eton and Christ Church, Oxford. He was lecturer in philosophy at Christ Church (1932-5); served with the Welsh Guards during the Second World War; and was Dean of Wadham College, Oxford, 1944-6. In 1946 he was appointed Grote prof. of the philosophy of mind and logic; F.B.A., 1952. His prin. works include *Language, Truth, and Logic*, 1936 (revised ed. 1946), *The Foundations of Empirical Knowledge*, 1940, *Thinking and Meaning*, 1947, and *Philosophical Essays*, 1954.

Ayesha, favourite wife of Mohammed. She was *b.* in 613 or 614, was married when she was 7, taking her toys to her new home, though the marriage was not consummated till 2 years later. The other wives complained of the favour shown her. After Mohammed's death she was important as one of the Mothers of the Believers and, when Ali (q.v.) was chosen caliph, she joined his enemies in Medina, went with their army to Iraq, where it was defeated, and she was captured 656. After that little is heard of her; she *d.* probably in 678. Legend makes her a learned saint.

Ayin-i-Akbari, title of a geographical and statistical account of the Mogul empire in India during the reign of Jelal-ed-din Mohammed Akbar, written by his vizier, Abul Fazl. It constitutes properly the third or concluding part of the *Akbar Nameh* of the same author, which gives an account of Akbar's ancestors and his reign down to the forty-seventh year. The *Ayin-i-Akbari* is divided into 4 parts; the first 3 are chiefly political and legislative; the fourth part is chiefly statistical and geographical, with an account of the ancient institutions, religion, and literature of the Hindus. Francis Gladwin made a free and abridged trans. into Eng. of the *Akbarnamah* (Calcutta, 1783).

Aylesbury, market, assize, and co. tn of Bucks, England, 38 m. NW. of London, and an important railway centre. Built on high ground, it overlooks the fruitful valley of A. It was captured from the Britons by the Saxons in 571. During the Civil war a battle was fought near here (1642). Until 1885 it was a parl. bor. The par. church of St Mary stands impressively in the centre of the tn,

surrounded by a quiet square of 17th- and 18th-cent. houses. The main fabric is Early Eng. (13th cent.); the famous font is Norman. The curious stunted lead spire was added to the tower c. 1670, and the whole church was drastically restored in 1850. Industries include printing, milk and milk products, and many other manufs. A. was formerly noted for rearing ducks for the London market. Pop. 21,054.

Aylesford, vil. of Kent, England, 3½ m. NW. of Maidstone, on the r. b. of the Medway. St Peter's Church, partly Norman but restored in 1878, has 15th-cent. brasses and an early embattled tower. There are remains of cromlechs in the neighbourhood (see KITS CORY HOUSE). The friary, now housing Carmelite friars, incorporates part of the original building of 1247. Pop. 3700.

Aylesham, vil. of Kent, England, 8 m. from Dover, situated among orchards, with mining and textile industries. Pop. 5000.

Ayllon, Lucas Vazquez de (c. 1476-1526 or 1530), Sp. soldier and explorer; *b.* probably in Toledo; a captain and a rich and learned man. Made *auditor de guerra* or legal adviser to the Viceroy of Hispaniola. No Nicolás de Ovando, whom he accompanied in Feb. 1502 in the largest expedition yet dispatched to the new Amer. lands. Formed a company with some other inhab. of Hispaniola and sailed out with 2 vessels to capture Indian Caribs as slaves for the mines. Storm-driven on E. coast of Florida, A. entered the prov. of Chicora and by treachery captured 130 natives, most of whom died of homesickness. In 1524 he prepared another expedition to conquer Chicora and landed on another part of the coast. In 1526 he estab. a colony on the site of Jamestown, Virginia, where he *d.* in same year. See Gabriel de Cardenas y Cano, *Ensayo Cronologico de la Florida* (Madrid), 1723, and Arthur Helps, *The Spanish Conquest in America*, 1855.

Aylmer, John (1821-94), *b.* A. Hall, Tivetshall St Mary, in Norfolk. He was educ. at Cambridge and in 1841 became chaplain to the Duke of Suffolk. Afterwards, when archdeacon of Stow, he was obliged to leave the country on account of his opposition to the doctrine of transubstantiation, but returned to England and resumed his office on the accession of Elizabeth. In 1862 he was made archdeacon of Lincoln, and in 1876 Bishop of London. He was avaricious, and notorious for his severe treatment of any who differed from him.

Aylmer, Matthew Whitworth, Baron (1775-1850), twenty-ninth Governor-General of Canada (1831-5), general in the army and colonel of the 18th Foot. His tenure of office followed the conciliatory policy of Sir James Kempt on the question of the constitution of the Executive and Legislative Councils. A. had had a distinguished military career, but no administrative experience. Hence he approached this question with at least an open mind, as indeed all constitutional problems in Canada. His administration

was characterised by a series of measures which profoundly altered the aspect of the outlook of the Fr.-Canadian party, driving it to a clear-cut policy which led to open violence. In 1834 the Assembly voiced its grievances in the '92 Resolutions,' which document was sent to the Brit. Gov. in London. A royal commission then investigated the affairs of Quebec, and recommended that its revenue should be handed over to the Assembly in return for a 'civil list,' but that there should be no legislative council. This negative recommendation completely alienated the Assembly, and A. was recalled. It was during his tenure, too, that the *Royal William*, the first steamship to cross the Atlantic, was launched from its Canadian shipyard. Again, it was A. who caused a memorial to Montcalm to be placed in the Ursuline convent chapel of Quebec city. Sev. tns, lakes, etc., in Canada are named in memory of him.

Ayloffie, Sir Joseph (c. 1708-81), anti-quarian. He was one of the first members of the council of the Society of Anti-quaries, and was later made a commissioner for the preservation of state papers. He was author or editor of a considerable number of books.

Aylisham, par. and mrkt tn in Norfolk, England, 10 m. SW. of Cromer. Pop. 2600.

Aymará, tribe of S. Amer. Indians. They were in former times the inhab. of the dist. round Lake Titicaca and the adjacent valleys, and form the chief element in Bolivia, though the race is now of very mixed blood. In ant. days the Incas attributed the origin of all Quichua civilisation to the home of the A.s, which was therefore 'sacred land' to them. The A.s undoubtedly appear to have possessed a considerable culture before they were conquered by the Incas in the 13th and 14th cents. Evidence exists of their having important cities and palaces, and the ruins of Tiahuanaco show that these were of colossal size. At the time of the Sp. invasion the A.s had been under the dominion of the Incas for a considerable time and were to some extent degenerate. They retained, however, the privilege of using their own language, and on the whole their treatment by the Incas suggested that the conquerors believed themselves to be of A. blood. To-day they are poor farmers, in an arid region, and their culture is a simple one. They now number about half a million in Bolivia and S. Peru. See H. Tschopik, 'The Aymará,' in J. H. Steward's *Handbook of South American Indians*, vol. II, 1946.

Aymer de Valence (d. c. 1260), Bishop of Winchester, a half-brother of Henry III, who obtained for him the see of Winchester. The appointment was a bad one, for A. was ignorant of England, greedy and idle, and by no means priestly in his mode of life. He repudiated the barons' constitution at the Parliament of Oxford in 1258, and was forced to leave the country.

Aymer de Valence, Earl of Pembroke (d. 1324), son of William de Valence, nephew of Bishop A. (q.v.). He was

appointed guardian of Scotland in 1306; he defeated the Scots in that year at Methven, but was defeated by Bruce at Loudon Hill in 1307. He joined the Lancastrian party, and was a fierce opponent of Gaveston, whom he captured in 1312; but was later reconciled to the king. In 1314 he was made Lieutenant of Scotland, and fought at Bannockburn. In 1322 he joined in the judgment and condemnation of Lancaster.

Aymestry Limestone belongs to the Ludlow group of the Silurian system. It is a dark grey concretionary rock, consisting of thin beds. It is named after the vil. of Aymestry, in Herefordshire, where it has long been quarried.

Aymon, surname borne by 4 brothers, Alard, Richard, Guiscard, and Renaud. They occupied a prominent place as heroes of the cycle of romance in the time of Charlemagne. Their exploits were described in a romance written by Huon de Villeneuve in the 13th cent., entitled *Les Quatre Fils Aymon*. Renaud also appears as a leading figure in Ariosto's *Orlando Furioso*.

Ayot St Lawrence, vil. of Herts, England, 8 m. N. of St Albans. Here is Shaw's Corner (National Trust), home of George Bernard Shaw (1856-1950). The church is in the classic style (1778). Pop. 143.

Ayr 1. SW. co. of Scotland, bordered on the N. by Renfrewshire, on the E. by Lanarkshire and Dumfriesshire, on the SE. by Kirkcudbrightshire and Wigtonshire, and on the W. by the frith of Clyde. Off the coast are Ailsa Craig, Lady Is., and Horse Is. The surface of the co. is mountainous in the SE. and hilly in the SE. and N.; the chief rivs. are the Ayr, Irvine, Doon, and Girvan, and Loch Doon is the largest loch. The Afton, Cessnock, and Lugar R.s are known from the poems of Burns. The co. is noted for the breeding of Ayrshire cattle, and for dairy products, and agriculture flourishes here. It is also one of the prin. mining cos. of Scotland, and bauxitic clay and fireclay are found in addition to coal. The manufs. are important, and include cotton and woollen goods, lace curtains at Galston and Darvel, cabinet-making at Beith, ship-building at Troon, Ayr, Irvine, and Ardrossan (which is also a seaport), steel works at Glegarnock and extensive engineering works at Ayr and Kilmarnock. There is an international airport at Prestwick. A. and Bute cos. together return 5 members of Parliament. Area 1132 sq. m.; pop. 321,200.

2. Royal municipal, and police burgh, and co. tn of Ayrshire, Scotland, a seaport 4½ m. SSW. of Glasgow. It may have been the site of a Rom. station; here in 1197 William the Lion built a castle which no longer stands. Picturesquely situated on the S. bank of the riv., it has a fine bay and beautiful sands, while there are some handsome public buildings. Its manufs. are numerous, and include leather, woollens, carpets, lace, boots, shoes, etc.; there are foundries, engineering works, and saw-mills. The prin.

imports are timber and agric. fertilisers, whilst among the exports are coal, iron, and manuf. goods, and agric. produce. Ship-repairing is also carried on, and the harbour has both wet and dry docks. In 1935 the municipal boundary was extended to include the vills. of Alloway and Whitelatts. At Alloway, 2½ m. S. of the tn centre, Robert Burns was b., 25 Jan. 1759. Prestwick airport is situated some 4 m. N. of the tn. Pop. 43,011.

Ayr, riv. of Ayrshire, Scotland, rising 4 m. E. of Muirkirk and flowing W. for 38 m. to join the firth of Clyde at Ayr. Trout and salmon are found in the riv.

Ayrer, Jakob (c. 1543-1605), Ger. dramatist, citizen, and legal officer of Nuremberg. His extant works comprise 36 humorous pieces and 30 dramas. His works, both humorous and serious in character, are marked by a vigour of diction and purity of style, but the line of demarcation between the grave and the gay is often not sufficiently clearly defined. His works include comedies, tragedies, Shrovetide plays, and *Singspiele*, in the tradition of the Eng. jigs.

Ayres, John (fl. c. 1680-1705), the most eminent writing-master of his day; as such he is quoted by Samuel Pepys in his *Calligraphical Collection*. A. began life in a humble way, but in time became a celebrated calligrapher and 'Master of the Writing School at the "Hand and Pen"' near St Paul's School in St Paul's Churchyard. He also may have been writing-master to St Paul's School. According to Robert More, A. introduced into England the 'Italian style' of penmanship. This is not exact (it was introduced here in the 16th cent.), unless More had in mind the It. 'Bâtarde' hand, which became fashionable in England in the late 17th cent. A. pub. *The A la Mode Secrétaire*, 1680, *The Accomplish'd Clerk*, 1683, *Paul's School Round Hand*, 1700, and other works. But his most important work was *A Tutor to Penmanship; or, the Writing Master: a Copy Book showing all the Variety of Penmanship and Clerkship as now practised in England* (2 parts), 1698.

Ayrshire Breed, see CATTLE.

Ayrton, Michael (1921-), painter, sculptor, author, designer. His first one-man show of paintings was held at the Redfern Gallery in 1943 and in 1955 there was a retrospective exhibition of his work at the Whitechapel Gallery. He has illustrated many books and was art critic of the *Spectator*, 1944-6.

Ayrton, William Edward (1847-1908), man of science, entered the Indian gov. telegraphic service in 1867, and, after becoming superintendent, was made an associate of the Royal Society of London in 1881. He made many improvements in telegraphy and in the dynamometer. His wife, the only woman member of the Institution of Electrical Engineers, carried out a series of experiments on the electric arc, and was awarded the Hughes medal by the institution in 1908.

Ayscough, Samuel (1745-1804), librarian, b. Nottingham. Owing to family misfortunes he was forced to work as a

millar and then as an overseer of pavours. Coming to London he joined the staff of the Brit. Museum as a cataloguer and became an assistant librarian. He indexed the *Annual Register* of 1758-80 and the *Gentleman's Magazine* of 1731-86, and compiled the first Shakespeare concordance. He took orders about 1781 and held various livings, the last being at Cudham in Kent.

Ayscough, William (d. 1450), Eng. bishop. He became Bishop of Salisbury in 1438, and had great influence at the court of Henry VI, being the king's confessor. As a councillor of the king he was held to be responsible for the evil deeds of the court, and in his own diocese was disliked because of his continual absence. In 1450, after celebrating mass at Edington, he was seized by the congregation and beaten to death.

Ayscue, Sir George (d. 1671), admiral of the Commonwealth period. He had been knighted by Charles I, but became a parliamentarian and commanded the fleet in the Irish Sea in 1649, being then appointed admiral. At the beginning of the Commonwealth he defeated the Dutch off the Downs. In 1651 he was sent by Cromwell to Barbados to reduce the Royalists to subjection. In 1652 he fought an indecisive engagement off Plymouth. He was superseded in that year, but became commander of the Swedish fleet in 1658, and a navy commissioner on the Restoration. He fought in the second Dutch war, was imprisoned in Holland in 1666-7, and on his return to England did not again take an active part in naval matters.

Aysen, prov. of S. Chile. Area, 34,357 sq. m. Pop. (1952) 26,262.

Aytoun, or Ayton, Sir Robert (1570-1638), poet, b. Kinaldie, Fife. Educ. at St Andrews, he attached himself to the court of James VI and I, to whom he had addressed a Lat. panegyric, was knighted in 1612, and remained in the royal service till his death. Acquainted with the leading wits of his day, including Ben Jonson and Hobbes, he was one of the first Scottish poets to write graceful Eng. verse. His chief poem is *Diophantus and Charidora*, while among his shorter pieces 'Inconstancy Unpraised' is counted the best. He was buried in Westminster Abbey. See his *Poems*, ed. C. Rogers, 1871.

Aytoun, William Edmonstone (1813-1865), poet, b. Edinburgh, was related to Sir Robert A. (q.v.). Educ. at Edinburgh Academy and Univ., he was called to the Scottish Bar in 1840. In 1845 he became Prof. of Rhetoric and Belles Lettres at Edinburgh, and in 1849 married the daughter of Prof. John Wilson (q.v.). He was a contributor to *Blackwood's Magazine* from 1836 onwards, and in 1855, in collaboration with Theodore Martin, he pub. the *Bon Gaultier Ballads*, which had great popularity. His *Lays of the Cavaliers*, 1848, went into 28 eds. Others of his works are *Poland, Homer, and Other Poems*, 1832, *The Life and Times of Richard I*, 1840, *Firmitian, a Spasmodic Tragedy* (pub. under the name T. Percy

(Jones), 1854, *Bothwell*, 1856, *Norman Sinclair*, a novel, 1861, and *Ballads of Scotland*, 1870; an ed. of his *Poems* was pub. 1921. See life by T. Martin, 1867.

Ayub Khan (1855-1914), Afghan prince, son of Sher Ali, formerly Amir of Afghanistan. Took possession of Herat in 1879 after his father's expulsion from Kabul by the British. In 1881 he invaded Afghanistan in order to win Kandahar and the sovereignty. Defeated Gen. Burrows at the battle of Maiwand, but while hesitating to attack Kandahar, his force was assailed by Sir Frederick (afterwards Lord) Roberts and routed. He renewed his invasion soon afterwards, but after a short-lived success was utterly defeated by Abd-ur-Rahman. Ultimately gave himself up to the British, by whom he was sent to India as a state prisoner. He d. at Lahore.

Ayuntamiento, see **CARILLO**.

Ayuthia, anc. cap. of Thailand, sacked by the Burmese in 1782, and now called Krung Kuo ('Old Capital'). It was founded in 1351, and during the 16th cent. was a great port, being divided into special divs. for the Chinese, Japanese, Malays, and Portuguese who traded there. It still remains a fairly important tn, the greater part of it being now built on the water. Most of its great buildings are now in a state of ruin.

Azais, Pierre Hyacinthe (1766-1845), Fr. philosopher, son of the musician of the same name; b. Sorèze. He entered a monastery, but soon renounced the monastic life. At first a warm partisan of the revolution, he changed his views and was thereupon sentenced to deportation. He took refuge in the hospital of the Sisters of Charity at Tarbes, where he had leisure for his philosophical studies. After the fall of Napoleon, the gov. granted him a pension of 6000 francs. He d. at Paris.



AZALEA

Azalea is a plant now included in the genus *Rhododendron* of the family Ericaceae, which is a native of the mts of Asia

and N. America. The popular, greenhouse, so-called Indian A.s are derived from *Rhododendron simsii*, a Chinese species; the 'Mollis' A.s from *R. molle*; the Kurume A.s from the Jap. *R. obtusum*; and there are numerous varieties and hybrids. *Azalea pontica* of Asia minor is *R. luteum*, and *Loiseleuria procumbens* is sometimes called the trailing A. They do well in a mixture of loam peat and leaf-mould, to which has been added some sand. They may be increased by cuttings planted in a sandy soil in slight heat in spring. These shrubs grow to a height which varies between 10 and 15 ft.

Azara, see **MUEZZIN**.

Azaña, Manuel (1881-1941), Sp. politician, b. Alcalá de Henares. He made a reputation as one of the leading Sp. men of letters. Towards the close of Primo de Rivera's (q.v.) dictatorship A. came to the fore as a democratic leader, and, after de Rivera's fall, he was elected president of the Madrid Academy. He was a member of the revolutionary committee which in 1931 signed the pact of San Sebastian, and in 1932 he became war minister to the provisional Republican Gov. A. was largely responsible for the grant of autonomy to Catalonia and for those articles of the constitution which curtailed the freedom of the religious orders and legalised the suppression of the Jesuits. He succeeded Alcalá Zamora as head of the gov. from 1931 to 1933. When Zamora was deposed by the Cortes in 1936 A. was again elected in his place and left active politics. During the Civil war he was little more than a figure-head, and when the Nationalist forces were marching on Barcelona he went into exile in France.

Azande, Sudanic-speaking Negro people living in SW. Sudan, NE. Congo, and SE. Fr. Equatorial Africa in the Upper Uele region. The A. State is an amalgam of many small tribes which were subjected by an invading aristocracy, the Avongara, and the total pop. is about 750,000. The state was greatly weakened by Arab slave traders in the last cent. The A. were cannibals (from which comes their popular name of *Niam-niam*), and are fine wood-carvers and musicians. See G. Schweinfurth, *Heart of Africa*, 1873; E. E. Evans-Pritchard, *Witchcraft Oracles and Magic among the Azande*, 1937; P. Baxter and A. Butt, *The Azande*, 1953.

Azara, Don Felix de (1746-1811), Sp. naturalist and patron of science. Entered the Sp. Army and served for some considerable time in S. America, being appointed to 'the Council of Fortifications and Defence of the Two Indias.' His most famous book, pub. in 1809, was *Travels in South America from 1781 to 1801*.

Azara, genus of evergreen Chilean shrubs, family Flacourtiaceae, about 12 species. *A. microphylla* is often grown on garden walls.

Azariah, popularly called **Uzziah**, King of Judah, 735-734 bc, succeeding his father, Amaziah. The name also belonged to sev. minor O.T. characters.

Azay-le-Rideau, Fr. tn in the dept of Indre-et-Loire, on the Indre. It has a magnificent Renaissance château. Pop. 2200.

Aazel, name found in Lev. xvi. 8, 10, and 26, where it is trans. as 'scapegoat.' Reference is made to one goat for Jehovah and one for A., and the antithesis is best conveyed by regarding the trans. of A. as Satan, or an evil spirit. By many authorities, however, the word is regarded as being purely impersonal and simply conveying the idea of a 'going far away.' The Lat. is *capr emissarius*. The word was used by Milton as a name for Satan's standard-bearer.

Azeglio, Massimo Taparelli, Marchese d' (1798-1866). It. author and statesman, b. Turin. He was descended from a noble Piedmont family, and at the age of 15 he went to Rome with his father who had recently been appointed ambas. there, and became well known as a landscape artist. He later pub. 2 political novels and became known for his advocacy of It. unity, but on monarchist lines. He was wounded in the battle of Vicenza, 1848. After Novara he was appointed president of the Cabinet by Victor Emmanuel II, a position he held until 1852, when he was succeeded by Cavour.

Azerbaijan, **Azerbijan** (Russian **Azerbaydzhan**), country comprising E. Transcaucasia (see **TRANSCAUCASIA**) and NW. Persia. The former part (N. or Soviet A.) is a constituent rep. of the U.S.S.R., the latter (S. or Persian A.) a Persian prov.

Soviet Azerbaijan is mountainous in the N. and S., with the Kura R. lowland in the centre and the Talysh lowland in the SE., and has generally a dry, continental climate. There are rich oil deposits, as well as iron, copper, lead and zinc ores, and salt. Area 33,100 sq. m.; pop. (1956) 3,400,000, mostly Turkic-speaking Azerbaijanians (who form 60 per cent. of the pop.), Russians (since the 19th cent.), and Armenians. A. has a large oil industry, engineering, textile, and food industries, cotton-growing, sericulture, horticulture, and viticulture; it also has sheep, buffalo, and horse breeding (local breeds), and old crafts (silk, carpets). The prin. tns are Baku (cap.), Kirovabad, Sumgait, Shemakha, Nakhichevan', Stepanakert, Shusha. The area belonged in succession to Rome, Persia, the Arabs, Mongols, and Seljuk Turks, and again to Persia. In the 13th cent. there were sev. khanates semi-independent from Persia—Shirvan, Karabakh, Gandzha, Baku, Talysh, Nakhichevan', Kuba, and Shaki (qq.v.)—which were conquered in Russo-Persian wars or voluntarily submitted to Russia in 1804-28. Rapid development of the oil industry started in the 1870's, and by the end of the cent. A. was the largest oil producer in the world. After the seizure of power in Russia by the Bolsheviks A. entered the anti-Bolshevik Transcaucasian Federation (q.v.). Upon the latter's break-up an independent A. Rep. was formed in 1918, dominated by the Mussavat (q.v.) party. Owing to the

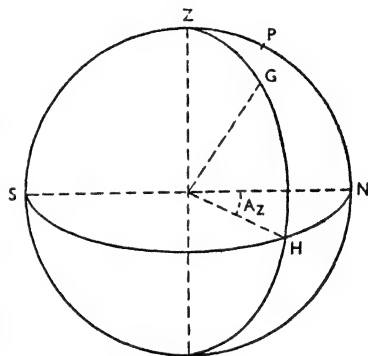
difficult international situation (military intervention by friendly Turks and hostile British, war with Armenia) and internal conditions (constant mutual massacres of Armenians and Muslims, Bolshevik underground in Baku) its existence was precarious, and in 1920 the Red Army easily conquered it. A. Soviet Rep. was proclaimed, which in 1922 was included in the Transcaucasian Federal Rep. and in the Soviet Union. Since the abolition of the Transcaucasian Federal Rep. in 1936 A. has been a constituent rep. of the U.S.S.R. See F. Kazenizadeh, *The Struggle for Transcaucasia*, New York, 1951; W. Kolarz, *Russia and Her Colonies*, 1952; R. Pipes, *The Formation of the Soviet Union*, Cambridge, Mass., 1954.

Azerbaydzhan, see **AZERBAIJAN**.

Azerbaijan, see **AZERBAIJAN**.

Azides, salts of azoimide or hydrazole acid. Azoimide (formula N_2H) has similar properties to those of hydrochloric acid.

Azimuth. The A. of a celestial object is the arc of the horizon measured from the N. point to the vertical of the body. In astronomy A. is measured from the N. point E. and W. up to 180°, and hence E. or W. must be inserted after the angle to show the correct A. In the figure the point H has the A. NH, 40° E.



In surveying, the exact bearing of at least 1 line and the lat. and long. of 1 station are needed to fit the survey into a main system and to place the system correctly on the surface of the earth. The direction of true N. is obtained from observation of a star whose A. is given in the Nautical Almanack, usually a circumpolar star at elongation or culmination, or the sun. When the direction to the star is observed, the A. being known, the direction N. is found.

Azinocourt, see **AGINCOURT**.

Azo, see **AZZO**.

Azo-Compounds, organic substances containing the group $R_1-N=N-R_2$, R_1 being an aryl radical and R_2 either an aryl radical or a substituted alkyl. Many A.-C. are important dyes, such as chrysoidine, Congo-red, and methyl-orange, and

other members of the group are azo-benzene, the amino-A.-C., the oxyazo-compounds, the diazoamines, diazoaminobenzene, the azoxy-compounds, etc.

Azo Dyes, see DYE.

Azo Pigments, see PIGMENTS.

Azoguo, quicksilver.

Azogues, cap. of Cañar prov., Ecuador. Area (of prov.) 1520 sq. m.; pop. 108,200.

Azoid (Gk *a*, without; *zōē*, life), geological term applied to such rocks as are found to contain no fossils. The constant tendency, however, is for geologists to discover traces of fossils in rocks hitherto considered A. Archaeozoic crystalline schists are held by some to form the A. system.

Azore, stuff like beaver cloth, manuf. in Styria, Austria.

Azores, or **Western Islands** (Portuguese *Açores*, from *acor*, hawk), archipelago in the Atlantic belonging to Portugal. It is situated between lat. 36° 55' and 39° 55' N. and long. 25° and 31° 16' W. There are 9 main is., divided into 3 natural groups: São Miguel and Santa Maria lie to the S.E.; 100 m. N.W. of them lie Terceira, Graciosa, São Jorge, Pico, and Faial; and 150 m. farther N.W. lie Flores and Corvo. Flores is 1176 m. W. of Cape Roca (q.v.). Politically the is. are part of Portugal, and for administrative purposes they are divided into 3 dists., named after the prin. seaports: Angra do Heroísmo, Horta, and Ponta Delgada (q.v.). The A. were evidently known to the Carthaginians, as Punic coins have been found on Corvo. They were known also to W. Europe in early medieval times, and were recorded on some maps of the period. They were, however, uninhabited when taken by the Portuguese, who colonised them 1431-53. They were presented by Alfonso V (q.v.) to his aunt, Isabella of Burgundy, under whose rule a large immigration of Flemings (see FLANDERS) took place. The is. are of volcanic origin, and their surface consists to a large extent of lavas and basalts; except for Flores, Corvo, and Graciosa, they are still liable to volcanic eruptions. There are many hot springs, the countryside is mountainous and rugged, and the coasts are in many places steep and inaccessible. The climate is moist but mild, and some of the is. are visited as winter resorts. Most of the flora is European, only about 40 plants out of a known 500 species being indigenous. Sugarcane, coffee, and tobacco are grown, as well as pineapples, oranges, bananas, and other fruit. Wine is produced, there is stock raising, and there is some whale fishing. The largest is. is São Miguel (41 m. by 9 m.), which contains more than half the pop. of the group, and the next largest are Terceira and Pico. Horta is an important cable station. Total area 890 sq. m.; pop. 317,400.

At the height of the battle of the Atlantic (q.v.) in 1943 the Portuguese Gov., at the request of Britain, agreed to grant temporary facilities in the shape of naval and air bases in the A. and other Portuguese is., which would enable better

protection to be given to merchant shipping in the Atlantic against Ger. submarines or other hostile craft. The agreement included provision for Brit. assistance in furnishing essential material and supplies to the Portuguese armed forces. These arrangements owed their validity to the treaty between Britain and Portugal made in 1373 and reinforced by 7 later treaties between 1386 and 1815, to a secret declaration of 1890, and, in more modern times, to treaties of arbitration made with Portugal in 1904 and 1914 which recognised the validity of all the antecedent treaties. Thus was vindicated an engagement which had lasted for nearly 6 cents., and which was without parallel in world hist.

See W. F. Walker, *The Azores, 1886*; J. Mees, *Histoire de la découverte des îles Azores*. Ghent, 1901; A. S. Brown, *Madeira, Canary Islands and Azores, 1922*.

Azorin, see MARTINEZ, RUIZ JOSE.

Azote (Gk *a*, without; *zōē*, life), name given at one time almost universally to nitrogen (q.v.), from the fact that it is unable to support animal life.

Azotised Bodies, substances which contain nitrogen and form part of the structure of plants and animals; such are albumen, casein, gelatine, etc.

Azotus, see AZHOD.

Azov (anc. Tanais), Russian port on the Don, near its mouth, in the Rostov Oblast. Pop. (1939) 17,500 (1926, 25,000). It was a Gk colony from the 3rd cent. BC, Genoese in the 13th cent., Turkish from 1471, and has been Russian since 1739.

Azov, Sea of, N. arm of the Black Sea, with which it is connected by the very narrow Kerch' strait (anc. Bosphorus (Immerius)). Area 14,000 sq. m.; greatest length 220 m.; average breadth 80 m.; maximum depth 45 ft. The water is very fresh and the Sea is frozen for 3 or 4 months almost every year. The main rivs. flowing into the S. of A. are the Don and the Kuban'. The chief ports are Zhdanov, Taganrog, and Kerch'. To the W. of the S. of A., and separated from it only by a long narrow sandy peninsula called Arabat, is the Sivash or Putrid Sea, a series of very salty lagoons and marshes.

Azpeltia, Sp. tn in the prov. of Guipúzcoa, on the Urola. One m. from it is the famous Sanctuary of Loyola, built round the house in which St Ignatius de Loyola (q.v.) was b. Pop. 8000.

Azrael, or **Raphael**, with Gabriel, Michael, and Uriel, the 4 archangels 'who go in and out before the glory of the Holy One.' Moslems regard him as the angel of Death, very similar to Fate. Jewish tradition has made him almost an evil genius. Christian tradition views him as the angel of healing from the part he plays in the book of Tobit. See also RAPHAEL.

Azrek, see BAIR-EL-AZREK.

Aztecs, *The*, are the best known of the numerous tribes which inhabited Mexico. The story of their early wanderings is told in their picture-writing. According to their hist., they came from a pleasant

land, Aztlan, somewhere to the NE., leaving it probably about the 7th cent. AD. They wandered towards the SE., led by their priests, leaving settlements which are distinguishable now. Finally, about 1200, they settled at Chapultepec, at the foot of the volcano Popocatepetl. However, their savage customs were resented by the tribe of the Chichimecs, and they were driven to the lagoons, but a hundred years afterwards they gained their liberty. Led by their priests, they chose a site for and built their cap., Tenochtitlan, also called Mexico, from the name of their god Mexitli. From this god also the A.



Mexican Embassy

SCULPTURE OF THE AZTEC TEMPLE OF
QUITZALCOATL

were called Mexicans, which name was afterwards applied generally to all the inhab. of the country. In this place they built up a magnificent civilisation, and by means of alliances and wars extended their empire over the greater part of what is now modern Mexico. Their later emperors, the Montezumas, were said to possess such wonderful treasures that they have become prototypes of magnificence, though it is probable that the greater part of this is due to tradition. Their religion included the sacrifice of human beings taken as prisoners of war. They were an agric. people, had an elaborate system of irrigation, and studied astronomy. According to their belief, time was divided into cycles of 52 years, the close of each cycle being supposed to portend some grave national disaster. During the last 5 days of each period they observed various religious ceremonies, intended to avert this catastrophe; immediately afterwards they gave themselves up to rejoicing. The last time that

this ceremony of 'tying up the years' was observed was in 1506. The last of the Montezumas succeeded in 1502. The A. were now at their greatest height, but they were feared and hated by all the surrounding nations, and this king, by carrying out a policy of wanton aggression and by the use of human sacrifices, increased this enmity. Rumours of the approach of the Spaniards had already reached Mexico. In 1517 emissaries of Velasquez, Governor of Cuba, penetrated far enough to see some of the glories. Hence, in 1519, Hernando Cortés began his famous expedition, which ended in the conquest of Mexico. He destroyed the greater part of the ships of Montezuma and advanced inland. Montezuma sent him gifts, and ordered him to return. Cortés replied insolently, and then proceeded to take advantage of the isolation of the A. He conquered and christianised Tlaxcala, a small rep. at enmity with Montezuma, and then advanced, Montezuma was forced to submit, and d. in 1520. Cortés was driven back for a time, but returned and besieged the cap., Mexico, for 80 days. With its fall comes the end of the native hist. of Mexico.

In the national museum of Mexico city is the famous Calendar stone of the A., or sun-stone, a beautiful and massive monolith of carved basalt, circular in form and 12 ft in diameter, which was used both as a sun-dial and calendar, such as the Egyptians and Chaldeans used. The inscribed procession of cyclical animals has given rise to the belief that the chronological system which produced the stone had some connection with the Tatar zodiac, and even with the Chinese and Indian astronomical system. Its age is about AD 1479, but it is said to have been a copy of some anterior stone evolved through the ages. Also in the museum is a sacrificial stone, 9 ft in diameter, sculptured from trachyte and upon which human victims in the terrible sacrifices of the A. were butchered, their breasts cut open with obsidian knives, and the still-beating heart torn out and flung before the statues of the war-gods in the temple on the *teocalli*.

Consult W. H. Prescott, *History of the Conquest of Mexico*, 1844; L. Spence, *The Civilisation of Ancient Mexico*, 1912; H. B. Parkes, *A History of Mexico*, 1950; G. C. Vaillant, *The Aztecs of Mexico*, 1950; C. A. Burland, *Magic Books from Mexico*, 1953.

Azuza, prov. in the Dominican rep., S. America, cap. Azua, with an international airport. Shallow pockets of petroleum are found in the region. Area 936 sq. m.; pop. 50,166.

Azuaga, Sp. tn in the prov. of Badajoz, in a silver- and lead-mining dist. It has Rom. remains. Pop. 17,500.

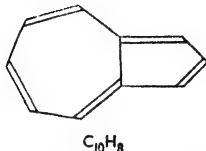
Azuay, S. prov. of Ecuador lying to the N. of Loja, and extending to the R. Amazon. It takes its name from the mt knot lying to the W. called Azuay. It is rich in ores, fertile, and well watered. The cap. tn is Cuenca. Area about 4000 sq. m.; pop. 276,152.

Azul, city and cattle dist. in the prov.

of Buenos Aires in the Argentine rep. The tn is the centre of a colony of Italians and Basques. The dist. has a pop. of about 44,373, the city 27,082.

Azulejos, Sp. and Portuguese name for tiles.

Azulene, synthesised by Pfau and Plattner in 1936 and shown to be a bicyclic hydrocarbon with a cycloheptane ring. Is a deep blue solid, melting point 99° C., and has the same odour as its



isomer naphthalene. A. occurs in nature, and is the parent substance of a group of colouring matters obtained from certain essential oils of the sesquiterpene type by oxidation or dehydrogenation.

Azun, dist. called the 'Eden of the Pyrenees,' in the SW. of dept of Hautes-Pyrénées.

Azuni, Domenico Alberto (1749-1827), It. writer on international law, and jurist, b. Sassari in Sardinia. He studied law at Sassari and Turin, and at the age of 32 was made a judge of the consulate at Nice. He pub. his general dictionary of mercantile jurisprudence in 1788, and in 1795 a book on the growth and progress of maritime law in Europe. He was appointed by Napoleon to be one of the commissioners engaged in drawing up a new commercial code, and in 1807 he

became president of the Court of Appeal at Geneva. After the fall of Napoleon he went into retirement until he was recalled and made a judge at Cagliari by Victor Emmanuel I.

Azure, heraldic term for blue. It is represented in drawings and engravings by horizontal lines.

Azurine, or **Blue Roach**, variety of the rudd, or red-eye, distinguished by its slate-blue back, silvery-white abdomen, white fins, and straw-coloured iris to the eye. It belongs to the Cyprinidae or Carp family. It is found all over the Continent, and has been introduced into England, not with very great success, although it is sometimes found in Lancs. The fish is small and hardy, affords good sport, and has firm, well-flavoured flesh.

Azurite, basic copper carbonate, name given to the stone which is also known as lazulite. This stone, together with lapis lazuli and mineral turquoise, is given the generic name of azure spar. It is a brittle, transparent mineral, with monoclinic crystals. It occurs in England in Derbyshire, Devonshire, and Cornwall, and in many parts of the Continent, such as France and Austria.

Azymes (Gk *a*, not; *zumē*, leaven), unleavened bread eaten by the Jews at the passover. (Heb. *Mazoth*.)

Azymites, name given by the E. Orthodox Church to the W. Christians who use unleavened bread for the Eucharist.

Azzo, sometimes called **Azo** and **Azzolenus**, prof. of civil law in the univ. of Bologna during the 13th cent. He has left us his *Readings on the Code*, which is considered by Savigny to be the most important contribution of his school.

B

B, second letter of nearly all the anct and modern alphabets. It is the exact counterpart of the Semitic *beth* (including N. Semitic and Hebrew), the Arabic *bē*, and the Gk *bēta*. The sound the letter represents is the sonant labial mute or lip-voice stop consonant, i.e. the sound produced by closing the lips and vibrating the vocal chords. In some languages, however, *b* tends to exchange value with *p*, *v*, *f*, or *m*. So, for instance, in the 4th cent AD, *b* in Greek came to assume the phonetic value of *v*, and hence in the Cyrillic alphabet and its descendants (Russian, Bulgarian, and so forth) the letter *b* has the phonetic value of *v*, but out of it a new letter was created to express the phonetic value of *b*. The symbol *b* passed through various forms. The capital B roughly corresponds with the anct Rom. and Gk classical B; the minuscule *b* is derived from the same form by eliminating a part of the letter (the upper loop), while the cursive form *ℓ* evolved from B by imperfect junctions of the loops. In the Aramaic alphabet the opening of the top of the letter *beth* was a prominent feature, and in its descendant, the square Heb. alphabet (the prototype of modern Hebrew), the upper loop completely disappeared. The evolution of the form of the Arabic *bē* (as of all the Arabic letters) was the most rapid amongst all the branches of alphabetic scripts. The numerical value of *b* is 2 in most alphabetic scripts. See ALPHABET.

B, in music. In English B represents the seventh degree of the diatonic scale of C, but in German H represents the Eng. B, while B represents the Eng. B♭. The musical signs denoting flat and natural are modifications of the letter *b*, i.e. the sign *b*, denoting flat, is a *b* with a slightly pointed loop, and the sign *n*, denoting a natural, is a *b* with a square loop. These signs are used because B was the first note of the scale to be modified by a semitone.

Baader, Benedict Franz Xaver (1765-1841), Ger. theologian and philosopher, *b.* Munich. He studied medicine at Ingolstadt and Vienna, graduating in 1784; but afterwards became an engineer, and was superintendent of the Bavarian mines from 1817 to 1820. Meanwhile, however, he had spent some years in England (1791-6), where his attention first turned to philosophy, and in 1826 he was appointed prof. of philosophy and theology at Munich. His writings, though mystical and too often obscure, have led some to consider him the greatest Catholic thinker of modern times; but his opposition to the claims of eccles. authority in the field of speculation led to a papal decree (1838) preventing laymen from lecturing on the philosophy of religion. B.'s works, with life by F. Hoffmann, were pub. in 16 vols. at Leipzig (1851-60).

Baal, 'Owner,' primitive Semitic title for the gods. In Palestine these local deities were agric., and were worshipped with fertility rites. The B. was represented by a stone pillar, perhaps phallic, perhaps animistic. It was natural for the invading Israelites to give the title B. to their own God, Yahweh, now that he had taken possession of the land. The word B. is found in many Semitic names, e.g. Jezebel (who introduced the worship of Melkart, the Tyrian B., into Israel), Hannibal, Baalbek, etc. We find many devout Yahwists including B. in their names, meaning of course by it Yahweh, e.g. Jerubbaal (Gideon), Meribbaal, son of Jonathan (deliberately perverted into Mephibosheth by later scribes). The practice held a real danger of syncretism, or pagan infiltration from heathen baalism, and the prophets stamped it out.

Baalbek, anct city of Coelo-Syria. The ruins stand 35 m. NNW. of Damascus and 38 m. SSE. of Tripoli. A centre of the worship of Baal (q.v.), whose symbol was the sun, it was known in Greek as Heliopolis. Of all Syrian cities B. was foremost for the beauty of its buildings and the splendour of its streets. It is remarkable now for the magnificent ruins of Rom. temples it possesses, among which one specially noteworthy is the Great Temple, the finest building in the city. The columns of the entrance measure 83 ft in height and 22 ft in circumference. Originally there were 54 columns, of which six are now standing, while the ground is strewn with the ruins of the remainder of the structure. A smaller temple stands to the S. of this, and is larger than the Parthenon at Athens. Both temples are of limestone. The actual hist. of B. is in its beginning difficult to trace. Without doubt it was used, as its name indicates, as a temple of Baal. Under Julius Caesar it was made a Rom. colony. In the 2nd cent. it was renowned for an oracle, and Trajan is said to have been sufficiently impressed with its powers to consult it before embarking upon his second Parthian war. The Great Temple was built by Antoninus Pius (AD 138-161), though the inhab. to-day attribute its erection to Solomon. Theodosius II. the Great converted it into a Christian church. During subsequent wars it was used as a fortress by the Arabs, traces of which are yet visible. In 1400 the city was completely sacked by Timūr Beg (q.v.). Near by is the largest cut stone in the world—60 ft by 17 ft by 14 ft—weighing 1500 tons. To-day the inhab. live in a state as wretched as the anct city was once opulent, and its pop. is only about 5000.

Baan, Jan van (1633-1702), Dutch portrait painter, *b.* Haarlem. By invitation of Charles II he came to England and painted portraits of the king and queen and many of the nobility. B.'s best piece of work is probably the portrait

of Prince Maurice of Nassau. He *d.* at Amsterdam.

Baasha, an Issacharite, slew Nadab, son of Jeroboam I, at the Philistine tn Gibeon. He afterwards killed all the rest of Jeroboam's family and became King of Israel (c. 909-886 bc). He prosecuted an energetic policy against Asa, King of Judah. By building Rama, he hoped to cut off Jerusalem from the outer world, but Asa procured the help of Syria. B. was buried at Tirzah, the royal residence. See 1 Kings xv. 27 to xvi. 7.

Bab, Babi, see BAHÁ'Í.

Baba: 1. Title formerly given in Persia and Turkey to members of certain dervish orders.

2. (The old woman), name of a favourite character in Slavonic mythology, represented as an old witch or hag with a hooked nose, prominent teeth, and grey dishevelled hair.

Baba, Cape, W. Asiatic Turkey. The Greeks called the cape Lectum, and it was important in classical times as separating Troas from Aeolia.

Babadag, tn situated in Rumania, cap. of the Dobrudja; has a considerable Black Sea trade; pop. (1930) 4600.

Babahoyo, or **Bodegas**, cap. of prov. Los Rios, Ecuador, S. America, on the R. Guayas. It is 40 m. NE. of Guayaquil, and is a busy trading centre. Pop. 9045.

Babar, see BABER.

Babbacombe, dist. of Torquay (q.v.), Devon, England, 2 m. from its centre, and a favourite resort of summer visitors. Gained much notoriety from the fact that the criminal Lee, who committed a murder at B., was thrice placed on the scaffold, the trap-door of which refused to work. Lee's execution was postponed, and subsequently commuted to penal servitude. Near by is Kent's Cavern, in which were found remains of prehistoric man.

Babbage, Charles (1792-1871), mathematician, b. Teignmouth, Devon, and promoter of an important Eng. mathematical revival. He observed that mathematical calculations were greatly impeded by the use of imperfect logarithm tables, and he devoted his attention to the construction of a correct table (1827). His ruling passion was the construction of a great calculating machine. The gov. contributed £17,000 and B. himself expended £6000, but the machine was never completed, owing to disagreements between the constructor and the gov. The imperfect machine is now in the S. Kensington Museum.

Babbitt's Metal, alloy of copper, antimony, and tin named after its inventor, Isaac Babbitt (1799-1862). It is an antifriction metal used for shaft bearings.

Babel, Tower of, according to Gen. xi the inhab. of B. built a tower with the intention of scaling heaven, and were foiled by having their speech confounded, which has been taken as an attempt to explain the diversity of speech among the different nations of the world. B. (Assyrian *Bab-ili*) is the native name for the Gk Babylon and signifies 'Gate of God.' It has no connection with the Heb. word *bālal*, signifying to confound.

There is an obvious similarity between this legend and the Gk myth of the Titans who attempted to scale heaven, but the Heb. legend is incomparably older. Behind it certainly lies the memory of the great ziggurat (q.v.) towers of Babylonia. These artificial mts or high places were temples, on the summit of which was the sanctuary, or dwelling place, of the God, i.e. heaven. Various sites have been suggested, e.g. Birs Nimrud 7 m. from Babylon, and Amran within the city. Nebuchadnezzar says that the Ziggurat Babili, or Tower of Babylon, 'the temple of the foundation of heaven and earth,' had been built to a height of 60 ft by a previous king who had not managed to complete it, and it was ruinous until he restored and finished it (*Kedinschriftliche Bibliothek*, III, ii. 52).

Bab-el-Mandeb, or The Gate of Tears, from its dangerous currents, is a strait separating Arabia and Africa. The Red Sea is joined to the Gulf of Aden by it. On the E. side it is called the little, and on the W. the great, strait.

Babelthuap, chief is. in the Palau group, W. Carolines, in the Pacific Ocean, being about 30 m. in length. It has a fertile soil, and is subject to volcanic eruptions. It was administered by the Japanese under mandate before the Second World War. Pop. (of the group) 6300.

Babenberg, name of a princely Ger. family which came from Franconia, near Bamberg, and fl. from c. 980 to 1246. The most famous member of the family was Leopold I, surnamed the Illustrious, who became margrave of Austria in the 10th cent. See VIENNA.

Baber, Edward Colborne (1843-90), author and traveller, b. Dulwich. Educ. at Christ's Hospital, he graduated from Magdalene College, Cambridge, in 1867. He went out to Peking as a student interpreter, and became a first-class assistant in 1872. In 1879 he became Chinese secretary of the legation at Peking. He made 3 journeys into the interior of China, in 1876, 1877, and 1878, which he described in *Travels and Researches in Western China*, 1886. *Chinese Tea Trade with Tibet*, 1886, which appeared in the Royal Geographical Society's *Supplementary Papers*, was awarded the medal of the society. He was consul-general in Korea (1885-6) and political resident at Bhamo on the Upper Irawadi from 1886 till his death. See the *Proceedings of Royal Geographical Society*, 1883, 1886, and 1890.

Baber (Fehir-ed-din Mohammed) (1483-1530), first great mogul of India. He was a descendant of Timur. At 12 he succeeded Omar Sheikh Mirza to the rule of the dominions lying between Samarkand and the Indus. Strife ensued owing to the usurpation of an uncle and the revolt of some of the nobles. With surprising courage and determination, however, the young ruler seized and held the provs. of Kashgar, Kunduz, Kandahar, and Kabul. Delhi and Agra speedily fell before the impetuosity of his attack. But his reign as mogul was short, for he *d.* after having reigned 5 years. Not

only were his talents remarkable in civil and military gov., but he possessed also a passion and genius for science and art, and to his many achievements of administration in the improvement of roads, the measuring of land, the levying of taxation, and postal organisation is to be added a hist. of his life and conquests written in the Tatar language. The eldest of his 4 sons succeeded him to the throne at Delhi.

Baber, or Babber, Islands, Indonesia, see Sunda Islands, LESSER.

Babeuf, François Noël (1760-97), Fr. revolutionary, b. St Quentin. He became a clerk, and on the outbreak of the Fr. Revolution he supported the extremists led by Marat (q.v.). In 1793 he adopted the title of Gracchus B. as editor of a paper called *Le Tribun du peuple*, uncompromisingly communistic in principle. He was guillotined for an attempt to overthrow the Directory and establish Communism.

Babilu, see BABYLONIA.

Babington, Anthony (1561-86), rebel, son of Henry B. and Mary, daughter of Lord Darcy. He was a fanatical Catholic, and acted as a page to Mary Queen of Scots when she was a prisoner at Sheffield. He soon became strongly attached to her and her cause. In 1586 B. was one of the chief promoters of a plot which had for its object the assassination of Elizabeth I, the liberation of Mary, and the reorganisation of the constitution in Catholic interests. Walsingham's spies unravelled the plot, and B. was arrested, tried, and condemned to death, vainly trying to save himself with offers of further information. The discovery of this plot was the immediate cause of Mary's own subsequent execution.

Babington, Churchill (1821-89), classical scholar, scientist, and archaeologist, b. Roedcliffe, Leics. He held the Disney professorship of archaeology at Cambridge, 1865-80, and lectured chiefly on Gk and Rom. pottery and numismatics. He was, moreover, an authority on botany, ornithology, and conchology. He catalogued the classical MSS. in the univ. library and the Gk and Eng. coins in the Fitzwilliam Museum. His fame as a classical scholar is based on his ed. of Hyperides' speeches (*Against Demosthenes*, 1850; *On Behalf of Lycophron and Euxenippus*, 1853; and *Funeral Oration*, 1858) from the papyri discovered at Thebes in 1847.

Babington, Francis (d. 1569), Eng. divine. When Elizabeth I came to the throne in 1558 the Catholic master of Balliol College, Oxford, was removed and B. appointed in his place. In 1560 he became rector of Lincoln College. Leicester chose him to preach Amy Robsart's funeral sermon at St Mary's in 1560, but later he appears to have lost his patron's favour. He was suspected of being a secret papist, was obliged to resign from the rectorship of Lincoln College, 1563, and in 1565 fled to the Continent, where he d.

Babington, Gervase (1550-1610), successively Bishop of Llandaff, Exeter, and Worcester; fellow of Trinity College, Cambridge; incorporated M.A. of Oxford

Univ., 1578. He became tutor to the Pembroke family, through whom he obtained many Church preferments. B. wrote many short treatises which are valued by collectors of Elizabethan quartos. They include his *Very Fruitful Exposition of the Commandments by way of Questions and Answers*, 1590 and 1600, and *Comfortable Notes upon the Bookes of Exodus and Leviticus*, 1604. A folio ed. of his works was ed. by Miles Smith, 1615.

Babinski's Sign, medical sign indicating organic disease of the motor nerve fibres of the spinal cord. Normally when the sole of the foot is tickled the toes turn downward (*flexor response*). If there is organic disease of the lateral columns of the spinal cord (the pyramidal tracts) the big toe turns upwards when the sole of the foot is tickled by stroking (*extensor response*). This sign is useful in distinguishing between hysteria and true organic disease. Babinski was a Fr. physician (1857-1932).

Babirusa, Babiroussa, or Babyroussa, interesting animal of the pig genus, and found only in the E. Indies, in Celebes and Buru. The B. is much more agile than the ordinary pig, having a less cumbersome body and longer and thinner legs. The peculiarity of this species lies in the fact that the upper canine teeth of the male are persistent, like those of rodents, and pierce through the skin of the snout and curve back over the forehead. The teeth have been known to penetrate the skull. The teeth thus correspond to the tusks and horns characteristic of the male sex of so many animals.

Babirush, see BABYLONIA.

Babol, dist. and tn in the prov. of Mazandaran, in Persia, formerly called Barforush. It had considerable trade with Tsarist Russia. Pop. of tn, 39,000.



BABOON

Baboon, or Dog-faced Monkey (*Papio*), genus of the primate family Cercopithecidae, which includes the mangabeys, macaques, mandrills, and guernons. Africa was their original home, though they have spread into the nearer portions of Asia.

The most characteristic features of the animal are prominent snout, large canine teeth, cheek pouches, strange ugly cushions on which it sits, and shortness of tail. It was sacred in Egypt, and figures frequently upon Egyptian tablet inscriptions and statues. They usually live in herds and form dangerous opponents, and will attack antelopes as large as sheep. More than the other monkeys, their food consists of animals such as scorpions, centipedes, and beetles. But they also eat roots, fruits, and other vegetables. They are intelligent animals and possess well-developed brains, besides extraordinary ferocity of temper.

Babrius (2nd cent. AD), Gk writer of verse fables on the model of Aesop. He was probably a hellenised Roman. Of the original 10 books, only portions have survived. These were ed. with commentary by W. G. Rutherford, 1883.

Babu, or **Baboo**, originally an Indian term of address applied to a proper name and corresponding to the Eng. 'Mr.' Under Brit. rule the word was often used as a rough trans. of the English 'clerk,' and lost in respect.

Babul Tree, *Acacia arabica*, also known as the gum-arabic tree, is a native of the E. Indies, Arabia, and Abyssinia. It is a tall tree and yields large quantities of gum-arabic, which is produced by wounding the bark and allowing the fluid to run out.

Babushkin (until 1938 Losinoostrovskaya), tn in Moscow Oblast of central Russia, 7 m. N. of Moscow, and a residential and industrial suburb of the cap. Pop (1956) 103,000 (1939, 70,000), the majority working in Moscow.

Babuyanes, Malay word meaning pig is. They are a group of is. to the N. of Luzon, one of the Philippine Is. The most prominent isles are Babuyan, Calayan and Camiguin. They are of a mountainous character.

Baby, see CHILD.

Baby Carriage. From illustrations there is evidence that wheeled carriages for a child are of great antiquity, known sev. cents. BC. The first reference to B. C.s in Britain is in the 18th cent., but it was not until the first half of the 19th cent. that their use began to be widespread. These first models were made of wood with solid iron spoke cart-type wheels and the first had 3 wheels only. In the second half of the 19th cent. more than a dozen Brit. manufacturers came into existence and about half have direct descendants to-day. The biggest fundamental change in the manuf. of B. C.s during the last hundred years has been the use of sheet steel or aluminium for the body instead of plywood, though this is not universal. Substantially a B. C. remains as it has been—an upholstered body with hood and apron, chassis, handle, and wheels. A major pre-war development was the introduction of shallow, detachable, and reversible bodies with hinged drop end and small wheels, and to-day these form 80 per cent of the non-folding types manuf.

Britain has always led the world in

B. C. fashion, and has always been the largest exporter. The perambulator industry, employing fewer than 5000 workers, is one of the smallest in Britain, and exports approximately one-tenth of its production. Despite the millions of babies born annually, only a very small proportion of mothers in civilised countries use B. C.s, and these are restricted in the main to the white pop. Early in the 20th cent. the metal folding baby car was invented in America and is to-day more universally used the world over than any other type. Outside Britain, the metal folding type of perambulator overwhelmingly predominates; this fashion is allied to the increase in motor car production, as this type of B. C. can often be accommodated in the boot of the car.



Marmet Ltd

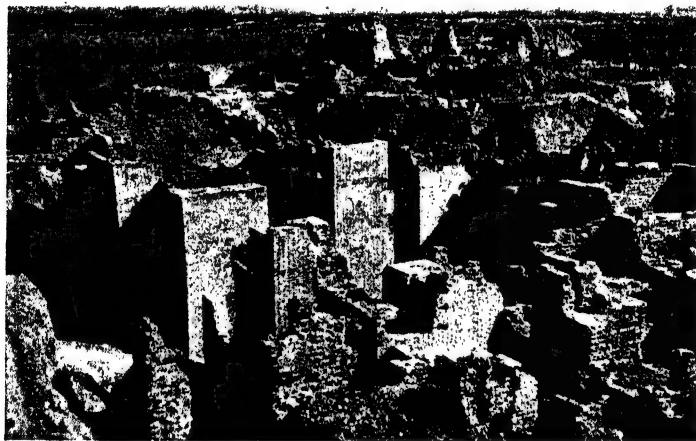
A MODERN BABY CARRIAGE

Babylon: 1. Anc. city and cap. of Babylonia, on the Euphrates, c. 50 m. S. of Bagdad. First mentioned in a cuneiform tablet c. 2700 BC, it became the cap., after the decline of neighbouring Agade (see AKKAD), c. 2200 BC. B. is the Gk form of Semitic *Babili*, Heb. *Babel*, written KA.DINGIR.RA in Sumerian, all meaning 'The gate of god.' The ruins cover a wide area which was first explored by Rich and later partially excavated by Layard, Rawlinson, and Rassam. The careful work by the Germans under Koldewey in 1899-1917 laid the foundation for much later archaeological/scientific exploration in the Near E. He uncovered the citadel (modern Mujellibe) with its massive Ishtar gateway decorated with coloured enamelled reliefs of lions (the symbol of Marduk (Bel), the prin. god worshipped at B.), horses, and composite creatures (*nushmushu*). The sacred Procession Way leading to the temple of Marduk, called Esagila, and many adjacent palaces and other buildings were found. The city was divided by the Euphrates, which was spanned by bridges, and protected by massive walls, each, according

to an eye-witness (the Gk historian Herodotus), 120 stadia long and capable of bearing a double track for chariots on their summit. Many inscriptions and objects remain of the Chaldaean period when Nebuchadnezzar II extensively rebuilt the city and its walls (c. 600 bc). The Hanging Gardens of B. (q.v.), described by Diodorus and other Gk writers as built by Nebuchadnezzar for his wife Nitocris, may be the ziggurat (q.v.) in the mound of Amran which was denuded during the last cent. by natives seeking bricks to build the adjacent modern city of Hillah. Little has been found of the

to the S., the desert beyond the Euphrates to the W., and the R. Diyala and the Hamrin Hills to the N. Throughout its early hist. B. was subdivided into Akkad (q.v.) in the N. and Sumer (q.v.) in the S. These, and *mat kaldu* (Chaldaea) (q.v.), the S. marshes, gave their names to B. as a whole at differing phases of its hist.

The earliest civilisation is to be found in B., which was occupied in the 5th millennium by both Semites and non-Semites (Sumerians?). Prehistoric sites, including Al Ubaid, near Ur, and Jemdet Nasr, near Kish, are closely followed by the flourishing cities of Ur 'of the Chaldees,' Erech



THE RUINS OF BABYLON

Old Babylonian B. of the time of Hammurabi (q.v.), when it flourished as an important metropolis. B. was cap. of the prov. of Babylonia under the Persians and Seleucids. The city walls were demolished following a revolt under Darius I. Alexander the Great spared the city after its capture, but although it continued as a religious centre dedicated to Bel until AD c. 50, its place as cap. was taken by the new city of Seleucia on the Tigris. See R. Koldewey, *The Excavations at Babylon*, 1914, and Seton Lloyd, *Foundations in the Dust*, 1955.

2. On the Nile S. of Cairo; perhaps originally a Babylonian suburb of Memphis after the Persian occupation, 525 bc. B. was a Rom. fortress and military station.

Babylonia (Babylonian *Babīlu*, Persian *Bābirush*), ancst state in the fertile flat plain watered by the lower Tigris and Euphrates, i.e. S. Mesopotamia, now S. Iraq. B. was bounded by the hills of Elam (Persia) to the E., the Persian Gulf

Eridu, Lagash, Umma, and Nippur, which were continuously inhabited from early to late Babylonian times. In the earliest historic periods these city-states fought for supremacy, which was, however, generally local until the rise of Sargon I and Naram-Sin, c. 2300 bc (see AKKAD), and Gudea of Lagash, c. 2300 bc, who conquered places in Syria and S. Anatolia. The period of the 3rd dynasty of Ur founded by Ur-Nammu (c. 2100-1900 bc) was a 'golden age' for Sumerian art and literature written in the cuneiform script (q.v.). After a few years when Lagash was supreme a strong Amorite dynasty under Samsu-iluna brought political power into Semitic hands again. This 1st dynasty of Babylon is best known from the reforms of Hammurabi (q.v.), King of Babylon, 1792-1750 or 1728-1686 bc, according to the main current views (Smith and Albright). He united the Semitic and Sumerian elements in the pop. by promulgating a revision of the existing Code of Laws, by turning much of

the power of the landowning temples over to civil administrators, and by grants of land on the borders of B. to army veterans. Under Hammurabi the cap. was transferred to the city of Babylon (q.v.), which was rebuilt and from which he controlled as far E. as Eshnunna. Hammurabi raided as far N. as Mari (q.v.) and was in diplomatic touch with Shamshi-Adad I

was suppressed by Tiglath-pileser (q.v.) III (745-727 BC), who took over direct rule of B. under his native name of Pul(u). A local sheikh, Marduk-apal-iddina II (Merodach-Baladan, q.v.), seized the throne in 721 but was ousted by Sargon (q.v.) II of Assyria except for a brief period (705-703) during the confusion following Sargon's death while Assyria was



After D. J. Wiseman, 'Chronicles of Chaldean Kings' (British Museum)

of Assyria and the powerful kingdom of Yamhad (Aleppo). The proposed identification of Hammurabi with Amraphel of Gen. xiv and of Shinar with B. is most uncertain. Like all the rulers of ancient B. Hammurabi ensured the maintenance of the complex canal and irrigation systems on which the prosperity of B. depended. From 1600 to 1100 BC B. was under Indo-Aryan Kassite domination. At this time Dur-Kurigalzu (Aqar Quf), W. of Bagdad, was an important city, but comparatively little is known of B. until it was once more under the Assyrians. With Nabunassar (747-734 BC) began a new era of resistance to Assyria. A revolt led by Ukin-zer

engaged in the W. Sennacherib, however, by a skillfully mounted amphibious operation chased Merodach-Baladan across the Persian Gulf and then in 689 sacked Babylon. His son Esarhaddon, as crown prince, acted as Governor of B., but after his succession to the throne of Assyria (669) he nominated his elder son Shamash-shum-ukin to succeed him as King of B., while Ashurbanipal ruled Assyria. This arrangement lasted until 648 when B. rebelled against Assyria, and in the subsequent revenge Shamash-shum-ukin perished in the flames of the stricken city of Babylon. An Assyrian nominee, Kandalanu, was appointed king, but after his

death in 627 there was an interregnum of a year until Nabopolassar (q.v.), founder of the Chaldaean Dynasty and leader of renewed opposition to Assyria, was chosen king. Although the Assyrian garrison at Nippur was not eliminated until 620 the hold of Assyria on B. gradually weakened. Nineveh fell in 612 to the combined forces of the Medes, Babylonians, and Scythians, and with the capture of the last Assyrian stronghold of Harran in 609 B. inherited the former ters. of Assyria. However, the Egyptians strongly contested the Middle Euphrates area until Nebuchadnezzar defeated Necho II at Carchemish in 605 B.C. B. thereafter controlled Syria and Palestine by a series of campaigns including a major battle with Egypt in 601. Nebuchadnezzar II (605-581) captured Jerusalem on 16 Mar. 597 B.C. and took Jehoiachin of Judah prisoner to Babylon. In subsequent campaigns Nebuchadnezzar attacked Elam, the Arabs, and Egypt, and suppressed an internal rebellion. With his wife, Nitocris, he extensively rebuilt Babylon, its defences, and neighbouring cities, and the city enjoyed one of its most flourishing periods. Evil-Merodach (q.v.) (Amel-Marduk) reigned 561-559 B.C. and eased the lot of the many foreign prisoners held in B., including Jewish exiles. He was murdered by his brother-in-law Neriglissar (Nergal-shar-usur), a former army commander, who campaigned as far afield as Cilicia, where he sought to restrain the Lydian pressure against the Pers. of B. under the influence of the Medes. Nabonidus (Nabu-na'id) continued the same policy in trying to maintain the independence of B., but fell out with religious leaders over his projected religious reforms and the rebuilding of the temple of the moon-god Sin at Harran. He made his son Belshazzar (q.v.) co-regent and withdrew to Teima (S. Arabia), where he ruled a small kingdom until warned by a dream to return to B. after an exile lasting 10 years.

About 550 B.C. Cyrus captured Ecbatana and consolidated his hold over the Medes, whose king Astyages he had defeated. In 538, aided by a popular revolt and by Gobryas of Gutium, Cyrus captured Babylon and estab. Persian (Achaemenid) rule there. His son Cambyses (529-521 B.C.) continued his liberal policies but a serious revolt followed on the accession of Darius I. A number of such revolts marked the Persian rule, some usurpers, e.g. Bardiya and Nebuchadnezzar III, even ruling for a short period until Alexander the Great took over B. in 332 B.C. Following his death the Seleucids, Parthians, and Sassanids ruled B. B. itself was never under Rom. occupation despite wars with the Parthians. In 650 B. became a seat of the Caliphs, successors of Mohammed, with Bagdad (built in A.D. 762-6) as cap. After the Abbasids in 1258 and cents. of Persian rule B. came under the Turks, and finally was occupied by the British 1914-21 (after which Mesopotamia became the independent Arab state of Iraq (q.v.) under Faisal I).

Many details of the life and thought of ant B. are known from tens of thousands

of clay tablets inscribed in the cuneiform script. These are written in Sumerian and Babylonian, with a few in Aramaic and Greek. Later, leather and papyrus displaced the more cumbersome clay tablet although a few astronomical texts continued to be written in cuneiform until A.D. c. 50. The texts cover all types of literature, epics (Creation and the Flood), myths, proverbs, scientific literature of all kinds, especially mathematics, medicine, astronomy, and geology, but with many religious writings: hymns, prayers, incantations, astrology, and omens (see ASSYRIA). The culture of B. was largely inherited from the Sumerians (see SUMER) and was in turn passed on to the Assyrians and the Greeks (see BEROSSUS). A unique historical source is provided by the Babylonian Chronicle which lists the principal events of each year. Their religion was polytheistic and each city had its principal deity and attendant gods, e.g. Sin at Ur, Anu at Erech, Ea at Eridu, and Bel (later Marduk) at Babylon itself.

Excavations have been carried on almost continuously in B. since interest was aroused by early travellers like Rich (1840), who was followed up by excavators among whom the names of Layard, Rawlinson, Rassam, Loftus, and Woolley (British), De Cesonaccio and Parrot (French), Koldewey and Andrae (German), are perhaps outstanding. For details of excavation, art, and architecture see the articles on cities of B.: BABYLON; ERECH; ERIDU; KISH; UR. For the contingent civilisations in B. see also ASSYRIA and SUMER.

Bibliography. L. W. King, *History of Sumer and Akkad*, 1910, and *History of Babylon*, 1915; R. W. Rogers, *History of Babylonia and Assyria*, 1915; Sir E. A. W. Budge, *The Rise and Progress of Assyriology*, 1925; H. R. Hall, *Ancient History of the Near East*, 1952; S. N. Kramer, *From the Tablets of Sumer*, 1954; Seton Lloyd, *Foundations in the Dust*, 1955; D. J. Wiseman, *Chronicles of Chaldaean Kings*, 1956; E. Chiera, *They Wrote on Clay*, 1956.

Babylonish Captivity, name given to the exile of Jews deported from Judaea to Babylon, after the capture of Jerusalem by Nebuchadnezzar. The exile lasted 70 years, till the Jews were allowed to return to their own land by Cyrus, who had conquered Babylon; though the N. tribes also had been deported to Mesopotamia over a cent. earlier, those who returned were exclusively of the tribes of Judah, Benjamin, and Levi.

Babyroussa, see BABIRUSA.

Baca, Valley of (Heb., valley of balsam trees), mentioned in Ps. lxxiv. 6, is probably El-Bakef'a, between Jerusalem and Bethlehem.

Bacacay, tn of Luzon, Philippine Is., on Tabaco Bay. It produces abaca, coco-nuts, and rice. Pop. 26,504.

Bacarra, tn of Luzon in the Philippine Is., 4 m. N.E. of Loag. It is situated in a fertile dist. in the prov. of Ilocos Norte. Pop. 15,851.

Bacău, or **Bakau**, cap. of the dist. of the same name in Moldavia, Rumania, on

the Bistrita, 50 m. WSW. of Jassy, and 188 m. N. of Bucharest by rail. It has a gymnasium, paper works, and some trade in agric. products. There is much petrol in the vicinity. Pop. (1930) 31,000, of whom half were Jews before the Second World War.

Bacca, technical name for the fruit commonly called by the name of berry. It is used to designate those fruits which have a thin skin, are pulpy internally, and have sev. seeds lying loose in the pulpy mass, e.g., the gooseberry, currant, and vine.

Baccarat, vulgarly called 'bac,' a card game of chance, said to have been introduced into France during the reign of Charles VIII, since when it has had widespread popularity. There are 2 types of the game—*baccarat à banque* (or *baccarat à deux tableaux*) and *baccarat chemin de fer* (q.v.). The rules of the game are intricate. In this country B. played for stakes is illegal, being a card game not involving skill, but on the Continent it is one of the most vicious and persistent gambling games.

Baccarat, Fr. tn in the dept of Meurthe-et-Moselle, on the Meurthe. It has famous crystal glass-works. Pop. 5000.

Baccha, genus of dipterous insects of the family of Syrphidae. It is remarkable in that the species have the 2 basal joints of the abdomen very long and slender, but the remaining joints depressed and suddenly increased in breadth. It is generally of a black or bronze colour, with yellow spots or markings, and is found in Britain.

Bacchae, Bacchantes and Maenades, women who took part in the wild orgies of the Bacchanalia, a festival of Bacchus. See DIONYSUS.

Bacchanalia, orgies in honour of Bacchus (q.v.). Men and women, intoxicated with wine, clothed in deerskins and Asiatic robes, with *thyrsi* (staves wrapped with ivy and vine leaves) in their hands, ran about beating drums and cymbals, and crying to Bacchus. B. were first introduced at Rome in 187 bc (Livy, xxxix, 8-10). Being celebrated every third year, they were called Trieterica. See also BACCHAE.

Bacchante, see BACCHAE.

Bacchelli, Ricardo, lt. novelist and literary critic, b. at Bologna in 1896. His best works are his 2 historical novels, remarkable for their wealth of detail, their humour, and their finished style. They are *Il diavolo al Pontelungo*, 1927, dealing with a 19th-cent. socialist movement; and his massive *Il mulino del Po* (3 vols.), 1938-40, a novel of epic dimensions, true to the Manzonian tradition. Eng. trans. are *The Devil at the Long Bridge* (trans. O. Williams), 1929, and *The Mill on the Po* (trans. F. Frenay, 2 vols.), 1952.

Bacchiglione, riv. of Italy, mainly in Veneto (q.v.). It rises in the Alps (q.v.), and flows SW. past Vicenza and Padua (q.v.) to the Gulf of Venice (q.v.) near Chioggia. It is navigable to Vicenza. Length 90 m.

Bacchius, Gk writer, sometimes in-

correctly called **Vaccens**. He was the author of *An Introduction to the Art of Music*, in Questions and answers, a work contained in the collection of Meibomius. It is not certain when he lived.

Bacchus, see DIONYSUS.

Bacchylides (fl. 467 bc), Gk lyric poet and nephew of Simonides (q.v.), b. Iulis in Ceos. From 478 until 467 he lived at the court of Hiero I of Syracuse, who is said to have proffered his work to that of Pindar (q.v.). The extant poems of B. are characterised by lucidity and picturesque detail. They consist of 14 *epinikia* and 6 dithyrambs discovered on an Egyptian papyrus in 1896 and first ed. by J. G. Konyon, 1897. There is also an ed. with commentary and trans. by It. C. Jebb, 1906. See B. Snell, *Bacchylides*, 1919.

Baccio d'Agnolo, see AGNOLO, BACCIO D'.

Baccio della Porta, see BARTOLOMMEO, DI PACHIALO DEL FATTORINO, FRA.

Bacciocchi, Felice Pasquale (1762-1841), see BONAPARTE, Marianne Elise Bonaparte.

Bacciocchi, Marianne Elise, see BONAPARTE, Marianne Elise Bonaparte.

Bach, Carl Philipp Emanuel (1714-88), the third son of Johann Sebastian, born Weimar. In his youth, though he studied under his father, he intended to adopt the legal profession. In 1738 he graduated, but soon abandoned the idea of a legal calling and decided to devote his life to music. The same year he went to Berlin, where he became private harpsichordist to the king. For his favourite instrument he composed very many sonatas and other works, while his *Versuch über die wahre Art das Clavier zu spielen* was recognised as an epoch-making book in the hist. of music. In 1767 he went as musical director to Hamburg. At Hamburg he composed church and instrumental music, and his *Sonaten für Kenner und Liebhaber*, which is his greatest work. He d. at Hamburg. His works suffered an undeserved eclipse for many years, but are now studied assiduously for their great historical interest, if rarely performed.

Bach, Johann Christian (1735-82), youngest son of Johann Sebastian, b. Leipzig. After his father's death he studied under his brother Carl Philipp Emanuel at Berlin. He became a pupil of Padre Martini in Italy in 1754, and in 1760 he was appointed organist at Milau Cathedral, for which he composed some masses. In 1762 he accepted an invitation to England. His success was rapid, and his operas and concertos were enthusiastically received. He soon became music master to the queen. Of his 13 operas *Orione*, 1763, and *La clemenza di Scipione*, 1778, were the best, but he also wrote a large amount of church and instrumental music, Eng. and It. cantatas, Eng. songs, etc. Mozart as a child was his pupil during the 1764-5 visit to London.

Bach, Johann Sebastian (1685-1750), one of the greatest musicians of the world. He was b. at Eisenach of a family of noted musical talent—the influence of sev.

members of which upon their relative was in some degree responsible for the great result. Before B. was 10 his father, Ambrosius, d. The boy was brought up by his brother Christoph, an organist at Ohrdruf, who withheld from him a MS. of organ compositions by great masters, perhaps from jealousy, but possibly only for some misguided disciplinarian reason. However, B. obtained access to the book, and copied it by moonlight. But the copy was taken from him when it was discovered although the work had taken the boy 6 months to accomplish. His beautiful soprano voice gained him a place in the choir at St Michael's School at Lüneburg, where he practised as an accompanist on the harpsichord and, after his voice broke, as a violinist. This was in 1700, and 3 years later he obtained a royal appointment at the court of Weimar, where he became acquainted with much It. music. The same year he became organist at the new church of Arnstadt, and here he began to compose. His brother's enlistment with the Swedish Guard led to the composition in 1704 of the *Capriccio on the Departure of a Brother*, which was followed and also preceded by sev. of his church cantatas. At this time B. obtained permission to go to Lübeck in order to hear the great Dan. organist, Buxtehude, then 68 years old. In his enthusiasm he over-stayed his leave, and this, with other reasons, led to a fresh appointment at Mühlhausen in 1707. He stayed here only a year, during which he married a cousin, Maria Barbara B. In 1708, aged 23, he returned to Weimar as court organist. Here he spent 9 years, and composed the best of his cantatas, while a close study of It. masters gave him a thorough mastery of their style, the foundations being thus formed for his later instrumental work. On one journey from Weimar in 1717 a quarrel arose between the supporters of B. and those of the Fr. organist Marchand, and a contest was arranged at Dresden. On the day fixed for the trial the Fr. musician was nowhere to be found, genuine acknowledgment of B.'s superiority rather than jealousy or fear being the causes of his flight. In 1718 B. left Weimar for the service of the Duke of Anhalt-Cöthen, and in 1720 his wife d.; in the following year he married Anna Magdalena Wilkens, who assisted him by copying his musical scores. It was then that B. began the composition of his suites, and the first half of the *Forty-eight Preludes and Fugues* was also written at Cöthen, though many years separated the first from the complementary portion. In 1722, after some difficulty, B. was appointed to the vacant position of cantor of the St Thomas School at Leipzig. Here he wrote all his finest choral work which includes the 2 settings of the story of the Passion and the Mass in B minor. In 1733 he presented 2 movements from the latter composition to Frederick Augustus, and received the title of *Hofcomponist*. In 1747 he visited Frederick the Great at Potsdam. The king, himself a musical amateur, received him with great regard. A few years later

B.'s eyes became painfully troublesome, and total blindness resulted from an operation. Apoplexy caused his death, aggravated by the remedies used during the operation. In his many clavier and



Embassy of the German Federal Republic

JOHANN SEBASTIAN BACH

harpsichord pieces B. introduced improvements in fingering, though modern fingering came only with Clementi (1732-1832). B. tuned his keyboard instruments in accordance with 'equal temperament,' exemplifying its possibilities in the 'Forty-eight.' As an organist he was supreme in his day and his organ compositions include many Preludes and Toccatas with Fugues, Fantasies and particularly the 143 Choral Preludes (q.v.) designed to introduce the hymn of the day in church. There are early biographies and critical works by H. Forkel, C. H. Bitter, P. Spitta (trans. 1899), and E. Heinrich. Later works on B. are: A. Pirro, *L'Esthétique de J. S. Bach*, 1907; C. H. H. Parry, *Johann Sebastian Bach*, 1909 (rev. ed. 1934); H. Grace, *The Organ Works of Bach*, 1922; C. S. Terry, *Bach: a Biography*, 1927, *Bach's Orchestra*, 1932, and *Music of Bach*, 1933; Albert Schweitzer, *J. S. Bach* (trans. by E. Newman), 1935; E. M. and S. Grew, *Bach*, 1947.

Bach, Wilhelm Friedemann (1710-84), eldest son of Johann Sebastian, b. Weimar, was by nature the most talented in the family, but his career was ruined by idleness and loose living. In 1746 he was appointed musical director of the Liebfrauenkirche at Halle, but lost this position owing to his dissolute habits. He lived a precarious life thenceforward, and d. in extreme want at Berlin. Some of his symphonies, concertos, trios, organ, and clavier works are extremely fine.

Bachan, see BATCHMAN.

Bacharach, Ger. tn in the Land of Rhineland-Palatinate (q.v.), on the Rhine (q.v.), 23 m. W. by N. of Mainz (q.v.). It has a fortress and two medieval churches, and has a trade in wine. Pop. 2600.

Bachaumont, Louis Petit de (1690-1771), Fr. man of letters, and a prominent member of Mme Doublet's salon for 40 years. His minor pubs. are *Essai sur la Peinture, la Sculpture et l'Architecture*, 1751, and *Mémoires sur le Louvre*, 1750; but he is chiefly remembered in connection with the *Mémoires secrets pour servir à l'histoire de la république des lettres*, pub. in Paris, 1771, in 6 vols., and afterwards extended to 36 vols. by Pidansat de Mairet and Mouflé d'Angerville.

Bachelier, Jean Jacques (1724-1806), Fr. painter, b. Paris. He was a director of the porcelain factory at Sèvres and also of the Academy of Painting, Sculpture, and Naval Architecture at Marseilles. In 1765 he founded an industrial school of art at Paris. He was received into the Fr. Academy as a flower painter in 1751 and as a historical painter in 1763, and exhibited at the Salon regularly between 1751 and 1767. His best-known works are 'The Death of Abel' and 'Cimon in Prison.' He is the author of *L'Histoire et le secret de la peinture à la cire*, 1755.

Bachelin, Auguste (1830-90), historical, genre, and landscape painter, b. Neuchâtel, and d. Berne. He studied in Paris under Gleyre and Couture. In 1859 he accompanied Garibaldi's volunteers, after which he painted many military and historical scenes.

Bachelor, word of uncertain etymology, probably derived, through the French, from Low Latin *baccalarius*, a word used in the 8th cent. of a servant, male or female, who assisted on a farm; cf. *baca*, Low Latin for *vacca*, a cow. (1) The word B. was early applied to a young knight or novice in arms who had no following of his own but fought under the banner of another. (2) It has also been adopted in univ. life. See **BACHELOR OF ARTS**. (3) In the popular sense of the word, it is used of an unmarried man, or candidate for matrimony. In Rome legislation placed unmarried men (*caelibes*) under certain disabilities, the chief of which were contained in the Lex Julia et Papia Poppaea in AD 9. The object of such legislation was to encourage citizens to bring up children for the State. Penalties on B.s were also inflicted in Sparta and at Athens. In England, too, higher taxes have, from time to time, been imposed upon B.s, but chiefly with a view to raising money for some additional State expenditure. In 1695 an Act was passed by which B.s and childless widowers had to pay a yearly tax of 1s. up to £12 10s. according to rank. In 1785 a higher tax was imposed for the servants of B.s, and in recent years deductions in income tax have been allowed to married persons with children. See **CELIBACY**.

Bachelor of Arts, for derivation, see **BACHELOR**. The word was first adopted into univ. life in the 13th cent. Pope

Gregory IX introduced the word *baccalarius* to indicate one who had undergone the first academical examination, but was not yet a 'master' or 'doctor.' The word was altered by a pun to *baccalaureus*, as if it were connected with *bacca lauri*, laurel berry. See **DEGREES**.

Baciccio, Giovanni Battista Gaulli (1639-1709), It. painter, b. Genoa, where he received instruction in design and colouring. Later he was a pupil of Bernini at Rome, where he painted portraits of the 7 popes and the cardinals of his time. His best known works are those in the angles of the dome at St Agnes in the Piazza Navona; the 'Assumption of St Francis Xavier' in the vault of the church del Gesù; the picture of St Anne kneeling before the Virgin and Child; and the altar-piece of the 'Death of St Saverio' in the church of Sant' Andrea.

Bacillus (dimin. of Lat. *baculus*, a rod), one of the forms into which bacteria are classified (see **BACTERIA**, classification).

Bacillus Pesticus, see **PLAGUE**.

Bacitracin, see **ANTIBIOTICS**.

Back, see **SPINE**.

Back, Sir George (1796-1878), Brit. Arctic explorer, b. Stockport. In 1808 he entered the Navy, but was made captive by the French in Spain. He was associated with Franklin in 3 polar expeditions in N. America. In 1833 he commanded in the expedition organised in search of Sir John Ross. During the expedition he suffered great hardships, but discovered Artillery Lake and the Great Fish (now Back) R. On his return he was made captain. In 1836 and 1837 he continued his Arctic expeditions. In recognition of his valuable discoveries the Geographical Society awarded both its medals to him. In 1839 he was knighted, and in 1857 he was made admiral. During the years of his retirement he suffered from ill-health. His works are a *Narrative of an Expedition in H.M.S. 'Terror'* 1838, and a *Narrative of the Arctic Land Expedition*, 1836.

Back Pressure, see **POWER STATIONS**; **TURBINES**, **STEAM**.

Backbond, term used in Scots law for a document, which shows that the possessor of property holds it only in security and is accountable to its real owner.

Backboned Animals, see **VERTEBRATES**.
Backer, Adriaen (1636-86), Dutch painter, nephew of Jakob B. (q.v.). He was b. in Amsterdam, and in early youth studied in Italy. He executed chiefly portraits and historical pieces. There is a fine picture of the 'Judgment of Solomon' in the tu hall of his native city.

Backer (or Bakker), Jakob de (1609-1651), Dutch painter, b. Harlingen; studied under Lambert Jakobz at Leuwarden and afterwards under Rembrandt at Amsterdam. He is chiefly known for his portraits, which he executed with remarkable facility and speed. He also painted historical subjects. There is an excellent head of Brouwer by this artist in the collection of the former elector palatine, and a picture of the 'Last Judgment' is in the cathedral church at Antwerp.

Backgammon, very old game in England which until the 17th cent. was called 'the tables.' The obvious derivation of the word is 'back game,' as it is necessary in order to win to bring one's 'men' back from the opponent's tables into their own, and there is also a penalty attached to the pieces of going back to the starting point. A similar game, the 'twelve-line game,' which consisted of a board, pieces, and the throwing of dice to control their moves, was in vogue among the Romans. The game is played in France, where it is called tric-trac, from its noise occasioned by the throwing of the dice. The game is one more of chance than of skill on account of the large part played by the dice-throwing. The board or table consists of 2 parts or 'tables.' At each end of the table are 6 points, alternately coloured white and black. Two persons take part in the game, owning each 15 pieces. The 2 sets of 15 are one black and the other white. At the commencement of the game the pieces are placed at particular places on the table. Two dice are used, and each person has his own dice box, though the dice themselves are used by both parties. The throws are alternate. In the event of a 'doublet,' i.e. the throwing that results in 2 similar numbers, the number signified by the dots may be doubled. Those numbers indicated accidentally by the dice when thrown bear a certain relation to the points of the table, and it is necessary to observe the position of the men on the points in order to understand the connection and the regulations that control movements. The persons sit at the tables so that the points of their opponents face them. Suppose one player be called Black and the other White. The question of 'starter' is decided by a throw of the dice, the higher score being the determining factor. The men are moved from point to point. The direction of White's moving is from Black's right-hand table to Black's left-hand table, then to White's outer table, and thence to White's inner table, completing the journey. Black's path is, of course, vice versa. The number signified by the dice, when thrown, indicates the number of points the thrower is allowed to travel unless the point at the end of the number is blocked by having 2 or more of his adversary's men upon it. The number indicated by the dice may be taken wholly with 1 man or shared between 2, so that each takes the number separately indicated. It is compulsory for a player to move the whole number signified if able. A 'point' is made by a player on placing 2 of his men on the same point. A 'blot' is that point occupied by 1 man; and it is cancelled by the arrival of an opponent who thus compels the previous occupant to go back to the bar. The numbers of the points count from the ace-point as 1, 2, 3, 4, 5, 6, and the man sent back to the bar is only allowed out again when the throw of the dice corresponds to the number of an unblocked point. While he has a man to enter, a player may not

move any other man. When all his men are in his inner table, or 'home,' the game is continued by that player for the purpose of removing his men from the board by throwing a number that corresponds with the point he wishes to empty. He may make a move with any number instead of bearing a man away. When 6 is empty, the same number being thrown is able to empty the other points, though, of course, singly. It is possible for a player to be hit on a blot while bearing his men off the board. In this case he must enter on his opponent's inner table and must move the man into his own inner table before he may continue taking his men off. The winner is he that succeeds first in removing all his men from the table. The degrees of winning are as follows: 1. A 'single' win if his opponent has begun bearing. (This is called a 'hit.') 2. A 'double' game if the adversary has not borne a man. (This is a 'gammon.') 3. A 'triple' win if the opponent has a man in the opponent's inner table. In the event of a series of games being played the beginner of the next is determined by the degree of victory. If a 'hit' is won the victor begins; if a 'gammon' a single die must be thrown. The winner of 2 games of 3 wins the 'rub.'

There is a Russian game called Russian B., which is in bulk similar to the Eng. game, as it varies in only a very few rules from the latter.

Backhaus, Wilhelm (1884-), eminent Ger. pianist, b. Leipzig. He studied music at the conservatoire, Leipzig, under Alois Reckendorf until 1899, and Eugen d'Albert at Frankfort-on-Main. From 1900 he made many concert tours throughout Europe and America, and won a reputation as one of the foremost pianists of the day. In 1905 he won the Rubinstein prize in Paris, and in the same year was appointed prof. of the piano at the Royal College of Music in Manchester.

Backhuysen, Ludolph (1631-1708), Dutch painter, b. Emden, Hanover. His masters were Everdingen and Dubbels. He is famous as a painter of seascapes, which are marked by their vivid realism. He worked for Peter the Great, d. at Amsterdam.

Backnang, Ger. tn in the Land of Baden-Württemberg (q.v.), 16 m. N.E. of Stuttgart (q.v.), with a Renaissance castle, a 15th-cent. church, and fine old houses. It has an important tanning industry, and manufs. of textiles, machinery, and electrical goods. Pop. 21,000.

Backs, The, lawns and gardens behind the prin. college buildings of Cambridge, England, through which runs the R. Cam.

Backwardation, term used on the stock exchange for a sum of money paid by a seller of stock to the buyer in order that he may delay its delivery until the following account.

Backwell, Edward (†1683), London goldsmith and banker at Unicorn, Lombard Street, one of the founders of the system of bank-notes. He had financial dealings with Oliver Cromwell, Charles II, and the queen mother, most of the

nobility of the day, and with the E. India Co. and sev. leading city firms. In 1662 he was sent to Paris on the matter of the sale of Dunkirk, and was employed on many secret services between Charles II and Louis of France. He was alderman for Bishopsgate, 1657, and M.P. for Wendover, 1679 and 1680.

Bac-ninh, cap. of the prov. of the same name in Tonking (q.v.), 16 m. N.E. of Hanoi (q.v.). B. has a Roman Catholic cathedral and an old citadel which was captured by the Fr. Gen. Negrier in 1884. The main industry of the tn is silk embroidery.

Bacolod, or **Bacolot**, former cap. of Negros, Philippine Is., now of the prov. of W. Negros. It is noted for its fishing and sugar exports. Pop. 22,920.

Bacolor, tn of the prov. of Pampanga in the is. of Luzon, Philippine Is., situated 40 m. N.W. of Manila. Sugar and rice are grown. Pop. 22,920.

Bacon, smoked meat product prepared from the sides, back, and stomach of pigs. In the Brit. trade B. generally consists of the whole side or half the side of the pig, or the half with only the shoulder end taken away; in America, of the smaller end from the back or stomach. Salt for preservation was used long before the preservation of food had reached its present stage of development. Pigs were cut up, put in brine tubs, and then smoked in an open chimney. The principle of B. curing is much the same to-day, but with the exception that it is now done in factories. Hams are often cured separately and sugar or molasses superadded to the salt. The hist. of B. production in Great Britain has been typified by cycles of over- and under-production. In an attempt to overcome this the Fatstock Marketing Scheme was introduced. This fixes a guaranteed minimum price below which the returns to producers are not allowed to fall but at the same time allows a competitive market so that the maximum price paid is not fixed.

Bacon, tn in SE. Luzon, Philippine Is., in a fertile dist. Pop. 22,859.

Bacon, **Anthony** (1558-1601), Eng. diplomat, brother of Francis B., educ. at Trinity College, Cambridge. In 1576 he was admitted with his brother a member of Gray's Inn. In 1579 he undertook a long continental tour, when he made the acquaintance of Montaigne, the essayist, Danaeus, an eminent Protestant theologian, and many leaders of the Fr. court. In 1593 he entered the service of the Earl of Essex, and undertook to keep him posted in foreign information, and as his private 'under-secretary of state for foreign affairs,' was in constant communication with numerous foreign ambas. Many of Bacon's letters remain in MS., much of which is preserved in Lambeth Palace library.

Bacon, **Delia Salter** (1811-59), Amer. authoress, b. Tallmadge, Ohio, sister of Leonard B. (q.v.). A schoolmistress and lecturer, she pub. sev. books, including *Tales of the Puritans*, 1831, and *The Bride of Fort Edward*, 1839. But she is remem-

bered chiefly as being one of the first to call in question Shakespeare's authorship of the plays called by his name. In 1857 she pub. *Philosophy of the Plays of Shakespeare Unfolded*, in which she expounded her theory that the so-called Shakespeare plays were written by Francis B., Edmund Spenser, Walter Raleigh, and others, in order to set forth a philosophy which they did not care to own publicly. For a time she received encouragement from Emerson and Carlyle, and Hawthorne writes of her in *Our Old Home* as a 'gifted woman.' She was insane during the last 2 years of her life.

Bacon, **Francis**, **Baron Verulam** and **Viscount St Albans**, often inaccurately called Lord Bacon (1561-1628), statesman, essayist, philosopher, b. York House in the Strand, London. His father, Sir Nicholas B., was Lord Keeper of the Great Seal; his mother, Ann Cooke, was a well-educated woman and a zealous Calvinist. Little is known of B.'s early life. In his thirteenth year he went to Trinity College, Cambridge, where he showed such intellectual precocity that the queen referred to him as 'the young Lord Keeper.' In 1576 he was entered at Gray's Inn and in the same year joined the embassy of Sir Amyas Paulet to France, where he remained till 1579, when the death of his father left him with straitened means. In 1582 he qualified as a barrister and in 1584 took his seat in the House of Commons as member for Melcombe in Dorset; subsequently he sat for Taunton, 1586, Liverpool, 1589, Middlesex, 1593, and Southampton, 1597. Failing to obtain help from his uncle, Lord Burghley, the great minister of the queen, he attached himself to Burghley's rival, the Earl of Essex, and in 1591 was installed as his confidential adviser. In 1593 he fell into disfavour with the queen through opposing her wishes in the matter of a subsidy, and was disappointed in his hope of becoming attorney-general, a post that was given to Edward Coke. He was still in straits for money, though Essex had presented him with an estate at Twickenham which he sold for £1800. At this point the downfall of Essex took place. Having formed a conspiracy he was arrested for treason. B. by his speeches helped to bring about his conviction and execution, after which he pub. *A Declaration of the Practices and Treasons Attempted and Committed by Robert Earl of Essex*, which was printed by authority. B. was taxed with ingratitude to his patron, but argued with some justice that his first loyalty was to his sovereign, and pub. this defence in a letter.

On the succession of James VI and I in 1603 B. was knighted and his fortunes took a turn for the better. He helped the king with his schemes for the union of England and Scotland and sought to pacify the Church of England and reconcile the claims of Crown and Parliament. In 1605 he pub. *The Advancement of Learning*, and in the following year married Alice Barnham, an alderman's daughter. His period of greatest success now began. Following his principle that

the sovereign's authority was supreme and that a statesman's first duty was to carry out the royal will, he supported the king against the claims of parliament, though always advocating toleration. In 1618 he was appointed Lord Chancellor, the highest office in the state, and created Baron Verulam, a title he changed in 1621 for Viscount St Albans. Now, however, at the height of his greatness, he was to meet with disaster. In 1621 want of money forced the king to convoke parliament, and the Commons at once proceeded to discuss the granting of monopolies, under cover of which Buckingham and others of the king's favourites had oppressed the people. Buckingham took fright, and proposed a plan by which certain people were to be sacrificed to the House to save others. The Commons, led by B.'s enemy, Coke, appointed a committee to inquire into the administration of the courts of justice, and B. was charged with having taken bribes in connection with Chancery suits. A list of 23 charges in all was drawn up, and B., seeing that his position was hopeless, gave up all idea of defence. He was accordingly found guilty of bribery and corruption, and the decision of the House of Lords was that he should pay a fine of £40,000, be imprisoned in the Tower during the king's pleasure, and never be permitted to hold office or sit in Parliament again.

The greater part of this penalty was never carried out. The fine was remitted, and the imprisonment lasted only 4 days; but B.'s career as a statesman was finished. There has been much difference of opinion about the degree of blame that attaches to him. He himself admitted frankly that he accepted presents from litigants, but insisted that they never influenced his judgment, and that on the contrary his decisions in the courts had always been scrupulously fair. Some years later he declared: 'I was the justest judge that was in England these fifty years; but it was the justest judgment that hath been pronounced these two hundred years.' It seems doubtful if he was guilty to any great extent of perverting justice, and after his fall he was treated with great consideration. He received a pension of £1200 from the gov., and his magnificence and extravagance were as great as ever, though he had retired from public life. He lived at Gorhambury, and spent his time in study and writing. To this period belong his *History of Henry VII*, his later philosophical and scientific works, and his *Apophthegms New and Old*, a somewhat jejune collection of jokes and witticisms. He was engaged on his *Sylva Sylvarum*, a work of natural hist., when he met his death, fittingly enough as the result of a scientific experiment. Wishing to test the preservative properties of cold, he dismounted from his coach in Highgate on a wintry day, bought a fowl at a cottage, and stuffed it with snow. The exposure brought on a sudden chill, and he d. of bronchitis. He was still deeply in debt.

B.'s work as writer and philosopher is

E.E. I

even more important than his political career. By far the best-known of his pubs. are the *Essays*, of which 12 first appeared in 1597; they were revised and augmented in 1612, and again shortly before his death; in its final form the collection totalled 58. These essays, though a novel literary form, were not what are commonly termed essays in modern times, when the word is used to denote a pleasant rambling discourse by an author who is as it were thinking aloud. B.'s essays were made up of detached reflections and observations, many of them so shrewd and pithy that they have become almost equivalent to proverbs. Such are 'Men fear death as children fear to go in the dark'; 'Revenge is a kind of wild justice'; 'Reading maketh a full man, conference a ready man, and writing an exact man.' B. himself, who regarded Latin as the language for work of permanent worth, was careful to see that there was a version of them in that language, for, as he put it, 'they come home to men's business and bosoms.' Another notable contribution to the country's literary development was B.'s *History of Henry VII*, 1622, a biography which he wrote to win favour from King James. It marks an important advance on earlier works of the kind written in English. Lives of great men before his time were either mere chronicles of their deeds and the events in which they played a part or homiletic discourses on the moral lessons to be drawn from their success or failure. As one of the first to study the psychology of his subject and to attempt a serious analysis of motives and purposes, B. may claim to be a pioneer in the development of the art of biography.

In the philosophic and scientific spheres also B.'s work was in advance of his time. He lived before the development of specialisation, in an age when it was still possible for one man to grasp and understand all that had been attained in the field of scientific investigation. At the age of 30 he wrote to Burghley: 'I have as vast contemplative ends as I have moderate civil ends, for I have taken all knowledge to be my province.' At Cambridge he had found the Aristotelian system which was the basis of philosophic thought there to be productive only of argument leading to no definite results, and had come to the conclusion that a new approach must be made to the whole problem of systematising knowledge. A new instrument of thought, a *novum organum*, must, he felt, be provided if men were to escape from the blind alley in which they had put themselves. Hence arose his great plan for the renewal of knowledge, his vast *Instauratio Scientiarum*, which he sketched out in 1620 in the introduction to his *Novum Organum*. It was a grandiose scheme, and he did not live to complete more than parts of it. First, there was to be a survey of existing human learning; the initial sketch of this was the *Advancement of Learning*, 1605, later revised and expanded in the Lat. version, *De Augmentis Scientiarum*, 1623. Second, there was to be a description of

Y

a new method of acquiring knowledge. The outline of this was the *Novum Organum*, 1620, which sets out its principles in an early passage, 'Man, being the servant and interpreter of nature, can do and understand so much, and so much only, as he has observed in fact or in thought of the course of nature.' The scheme was to have been completed with a section assembling empirical data, another containing solutions to the problems that these brought with them, and the final section was to embody a new philosophy. Most of these later sections were never written, but part was covered by the *New Atlantis*. Containing a description of B.'s ideal form of commonwealth, this has been compared with More's *Utopia*; it is at times remarkably up to date in describing the possible application of science to human problems, and even forecasts the telephone.

The influence of B.'s work was very great, and he is rightly regarded as the father of modern scientific research. Though properly speaking neither scientist nor philosopher, he was able through the profundity of his intellect to point the way of progress to both of these. By abandoning the deductive reasoning that was based on traditional arbitrary premises, and substituting the principle of inductive reasoning, he formulated a new system for the interpretation of nature. He showed that conclusions of real worth could only be reached by trial and experiment and by piecing together fragments of tested knowledge. Hence he was the prophet of a new era, opening the way to future progress. As Macaulay put it: 'The art which Bacon taught was the art of inventing arts. The knowledge in which Bacon excelled all men was a knowledge of the mutual relations of all departments of knowledge.' With all his faults, he stands out as one of the greatest of this country's thinkers, and it was not for nothing that Pope styled him 'the wisest, brightest, meanest of mankind.' His nature was a bundle of contradictions, but of his mental pre-eminence there can be no question.

His works were ed. by J. Spedding, R. L. Ellis, and D. D. Heath, in 14 vols., 1857-74. See also lives by R. W. Church, 1884, and E. A. Abbott, 1885, and studies of his philosophy by C. D. Broad, 1926, and F. H. Anderson, 1948.

Bacon, Henry (1866-1924), Amer. architect, b. Watseka, Illinois, and studied architecture at Illinois Univ. From 1891 until his death in 1924 he practised independently. Among the notable buildings he designed were the Union Square Savings Bank, New York; Public Library, Patterson, New Jersey; and the Whittemore Memorial Bridge, Naugatuck, Connecticut. He also designed the Civil War and World War monuments at Yale Univ., and the Parnell monument in Dublin. The Lincoln Memorial, erected at Washington, completed in 1920, was his most important work and was the result of a competition.

Bacon, John (1740-99), sculptor. He trained as a modeller and painter on

porcelain. In 1769 a bas-relief representing the flight of Aeneas from Troy won for him the first gold medal ever awarded by the Royal Academy for sculpture. In 1770 he exhibited a figure of Mars, and in consequence received the gold medal of the Society of Arts and was elected an associate of the Royal Academy. His rivals accused him of ignorance of classic style, and to repudiate the charge he executed a head of Jupiter Tonans. The best known of his works are the monuments of Pitt in Westminster Abbey and the Guildhall, of Dr Johnson and Howard in St Paul's Cathedral, and of Blackstone in All Souls', Oxford.

Bacon, Leonard (1802-81), Amer. Congregational minister, editor, and author, called 'the Congregational Pope of New England'; b. Detroit, Michigan. Graduated at Yale Univ., 1820, and Andover Theological Seminary, 1823. In 1825 became pastor of the First Church, New Haven, with which he was connected till his death. Ed. the *Christian Spectator*, 1826-38. He was prof. of didactic theology at Yale Univ.

Bacon, Nathaniel (1642-76), b. in England, but emigrated to Virginia, where he became a member of the governor's council. Headed an expedition against the Indians, in defiance of Governor Berkeley's policy. Was proclaimed a rebel, captured, tried, and acquitted. B. and his supporters demanded a reduction of taxes and an extension of the suffrage. Being for a second time proclaimed rebels, they marched on Jamestown, which they captured and destroyed, but B. d. before he could carry out any of his reforms.

Bacon, Sir Nicholas (1509-79), statesman, father of Francis B. (q.v.). He graduated at Corpus Christi College, Cambridge, in 1527, after which he entered Gray's Inn and was called to the Bar, 1533. In 1537 he became solicitor of the court of augmentations; in 1546 attorney of the court of wards and liveries; in 1550 he became a bench, and in 1552 treasurer of Gray's Inn. After the dissolution of the monasteries in 1539, he received a large share of the forfeited estates from Henry VIII. During Mary's reign he retained his office in the court of wards in spite of his unconcealed Protestantism. On the accession of Elizabeth in 1558 he became a Privy Counsellor and keeper of the great seal. In 1559 he was knighted and was allowed to exercise full jurisdiction of lord chancellor. B. is buried in St Paul's Cathedral.

Bacon, Sir Reginald Hugh Spencer (1863-1947), admiral; educ. H.M.S. *Britannia*. In 1897 he was appointed commander of H.M.S. *Thesius*. He started the submarine service in the R.N., and was naval assistant to the First Sea Lord in 1905. Captain of H.M.S. *Dreadnought* during her first commission; director of naval ordnances and torpedoes, 1907-9. Retired 1909 and became managing director of the Coventry Ordnance Works. When the First World War broke out he commanded the Heavy

Howitzer Brigade, Royal Marine Artillery, with the B.E.F. (q.v.) in France. Rendered great service in command of the Dover Patrol (q.v.) from 1915 to 1918. In 1918-19 he was controller of the munitions inventions dept at the Admiralty. Pub. *Benin, the City of Blood* (he was chief of intelligence service in the Benin expedition of 1897), *The Dover Patrol*, 1919, *The Jutland Scandal*, 1925, *A Naval Scrap Book*, 1925, *The Life of Lord Fisher of Kilverstone*, 1929, *The Concise Story of the Dover Patrol*, 1932, *The Life of John Rushworth, Earl Jellicoe*, 1936, and *Modern Naval Strategy* (with F. E. McMurtrie), 1940.

Bacon, Robert (d. 1248), first Dominican writer in England, the brother or, according to some authorities, uncle of Roger B. He was educ. at Oxford and Paris, joined the order of the Dominicans, and (possibly) succeeded Edmund Rich as treasurer of Salisbury Cathedral in 1233. He rebuked Henry III for his fondness for foreign advisers, notably Peter des Roches. He wrote a life of Edmund Rich, *Liber in sententias Petri Lombardi, Sectiones Ordinariae*, and other works.

Bacon, Roger (c. 1214-92), philosopher and scientist, b. near Ilchester, Somerset. He was educ. at Oxford, and also at Paris where he lectured for many years. It was during this period that he wrote the *Questions on Aristotle's Physics* and on the pseudo-Aristotelian *De Vegetalibus*. B. resigned his lectureship in 1247 and devoted himself to experimental science. Returning to Oxford c. 1251, he met Robert Grosseteste (q.v.) who exerted a powerful influence on his intellectual development. B. joined the Franciscans c. 1257, returning to Paris not long afterwards, and wrote his *Computus Naturalium* and probably *De Spectaculis* and *De Mirabili Poteestate Artis et Naturae*. At the invitation of Pope Clement II he next undertook what may be described as an encyclopaedia of learning. Having produced the *Communium Naturalium* and *Communium Mathematica*, B. saw that he had attempted too much. He therefore set to work on the *Opus Majus*, *Opus Minus*, and *Opus Tertium*. These were followed (c. 1268) by a treatise on alchemy; after which B. returned to Oxford. There he wrote his glosses on the *Secreta Secretorum*, the *Compendium Philosophiae*, and a Gk and a Heb. grammar. His last work, *Compendium Studii Theologiae*, was completed in 1292. B. did much to foster experimental physics and chem., and he made valuable contributions to the science of optics. He also encouraged the study of anc. languages, and pressed for a revised ed. of the Bible. Although he mistrusted undue reliance on authority, he held that all knowledge was contained in Scripture. In many respects he was in advance of his age, but shared a number of popular beliefs such as the philosopher's stone and the doctrine of signatures. B.'s works have been ed. as follows: *Opus Majus*, *Opus Minus*, *Opus Tertium* and *Compendium Studii Philosophiae*, by J. S.

Brewer in *Rogeri Bacon Opera Quaedam hactenus inedita*, 1859; *Opus Majus*, by J. H. Bridges, 1900; *Opera hactenus inedita Rogeri Bacon*, by R. Steele and others (16 vols.), 1905-47; *Textes inédits et autres textes de Roger Bacon*, 1948. See A. G. Little, *Roger Bacon: Essays* (with full bibliography), 1914; *Roger Bacon*, 1928; T. Crowley, *Roger Bacon*, 1950.

Bacon Beetle (*Dermestes lardarius*), destructive species of beetle, which attacks bacon, dried foods, and stuffed collections. The insect is small and black, with the exception of the root end of the wing, which is golden-brown and dotted with 3 dark spots.

Bacon-Shakespeare Controversy, see SHAKESPEARE, WILLIAM.

Baconthorpe, Bacon, or Bacho, John (d. 1346), schoolman and philosopher, called 'Doctor Resolutus', the grand-nephew of Roger B. (q.v.). He entered a Carmelite monastery near Walsingham, graduated at the univ. of Paris, and became the head of his Order in England (1329-33). In 1333 he went to Rome, and returned to England in 1346. He defended the teaching of Averroes (q.v.) against St Thomas Aquinas, and wrote commentaries on the Bible and numerous treatises, including *Commentaria super Libros I-IV Sententiarum*, Paris, 1485. See *De Scripturibus scholasticis Saeculi XIV ex Ordine Carmelitarum*, 1931, pp. 167 ff.

Bács-Kiskun County, see KECSKEMÉT.

Bacteria are microscopic organisms which have no chlorophyll and consequently most of them are unable to synthesise their body substance (protoplasm) from simple inorganic materials. A few, however, such as the iron and sulphur and nitrifying B. mentioned below, are able to build up protoplasm from carbon dioxide and salts by the process of chemosynthesis, allied to photosynthesis of green plants but taking place in the absence of light. In many respects B. closely resemble the fungi, and so are sometimes grouped as Schizomycetes, on account of their reproduction by fission (Gk *schizein*, to cleave; *mukes*, fungus). It is, however, preferable to regard B. as a distinctive group of very simple living organisms which have not yet evolved into either plants or animals, and which may resemble the primitive forms of life first produced on the earth. The names bacilli, microbes, micrococci, micro-organisms, and germs are also popularly applied to the group as a whole. Their multiplication is so rapid that they may produce more than 16,000,000 in a day, and they are so minute that about 2500 of some of the larger forms, placed end to end, would measure about one-tenth of an in. Others cannot be seen even under the highest magnification of the microscope, and their presence is detected, or rather deduced, only from their effect on other organisms in which they cause some of the most virulent diseases. Such ultra-microscopic forms are known as the filterable viruses, because they pass through the pores of a

porcelain filter. If the pores be fine enough, the virus may be separated from the microscopic B. (see VIRUSES).

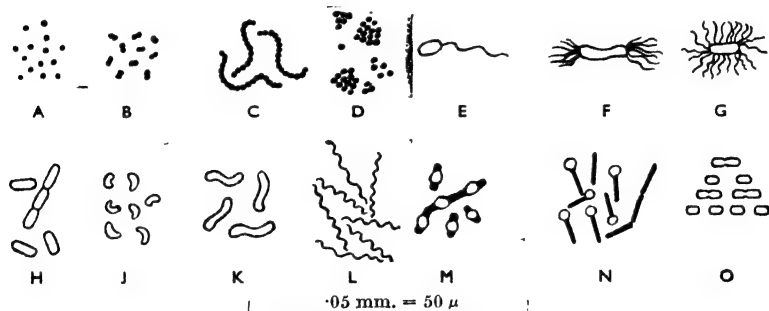
Classification. The classification of B. is unsatisfactory, because the main diagnostic feature on which it was originally based was that of the shape of the cell. This method has been in use so long, and has consequently collected so much nomenclature founded on this feature, that there are obvious disadvantages to the medical profession in replacing it by a newer system of terminology. Moreover, the ready recognition of external form is of great importance in clinical work. Such a system of classification is, however, not really scientific, and the Society of Amer. Bacteriologists has

of the groups, are described as a diplococcus, e.g. the *Gonococcus* and *Pneumococcus*.

(d) *Sarcinae* divide in 3 planes, 2 longitudinal and 1 meridional, at right angles to one another, and so form groups of 8.

(2) *Bacilli* are rod-like B. which are really cylindrical. The main axis of the cylinder may be relatively long or short, and the ends may be flat or convex, so that under the microscope the bacillus looks like a rod with square or rounded ends. It may have flagella at one or both ends, or all round the body, or flagella may be absent.

(3) *Spirilla* are curved, rod-like forms. The curves may be undulatory or spiral;



BACTERIA

A, cocci; B, diplococci; C, streptococci; D, staphylococci; E, monotrichous flagella; F, amphitrichous flagella; G, peritrichous flagella; H, bacilli; J, vibrios; K, spirilla; L, spirochaetes; M, anthrax spores; N, tetanus spores; O, division of a bacterium.

suggested a system comparable to that of the higher plants.

The classification at present still in use in Great Britain divides B. into higher and lower forms. The latter, or Eubacteriales, are far more numerous, and include motile and non-motile unicellular organisms, consisting of a mass of protoplasm within an investment. Spores may be formed within the cells, and such spores are called endospores. Eubacteria are of 4 main types, and are classified according to their shape as:

(1) *Cocci*. These are spherical organisms reproducing by fission, but various members of the group divide in different ways, and so sub-divs., dependent on the mode of fission, have been formed.

(a) In *Streptococci* (Gk *streptos*, twisted) divs. occur in only 1 plane, and the cells are held together in a row by their gelatinous investments.

(b) In *Staphylococci* (Gk *staphulē*, bunch of grapes) divs. may occur in any plane and so will result in the formation of an irregular mass of cells.

(c) *Micrococci* in fission form groups of 4 or multiples of 4 by div. in 2 planes at right angles. Two of these cells, remaining in contact after the separation

at each end of the motile forms are from 1 to 20 flagella.

(4) *Spirochaetae* are non-flagellate, motile, spiral, or undulatory cells, usually comparatively long and thin. Various types of movement are effected by the contraction of the cell, and in some forms one end tapers so considerably that it is comparable to a flagellum.

The higher B. consist of branched or unbranched septate or aseptate filaments often invested with a gelatinous sheath. The units of these filaments resemble separate B., but the filament must be regarded as a simple colonial aggregate, for the units are interdependent and have sometimes a very special function. The unit at one end often fixes the organism while that at the free end divides, releasing spores called conidia, which can reproduce the bacterium immediately if conditions be favourable. The 3 chief orders of this group are:

(1) *Chlamydo- or Tricho-bacteria*. These are unbranched, filamentous forms, often with a narrow fixing base. They are mainly aquatic, and their envelope frequently contains iron oxide. Such forms are popularly described as 'Iron B.'

(2) *Streptothrices* are branched aseptate

filaments which may produce special reproductive branches from which chains of rounded conidia are formed, or the filament may reproduce by dividing transversely into a number of rods.

(3) *Thiobacteria* or 'sulphur B.' contain sulphur and sometimes bacterio-purpurin. A sheath is not always present, and the organisms may be free or attached. The free forms move by protoplasmic contraction.

The Amer. classification divides the B. into the six orders: (1) Eubacteriales; (2) Spirochaetales; (3) Chlamydo-bacteriales; (4) Thiobacteriales; (5) Actinomycetales; and (6) Myxobacteriales (see Buchanan, *General Systematic Bacteriology*). In this classification B. producing diseases in human beings belong to orders 1, 2, and 5.

Structure. Examined under the microscope, B. are seen as minute and transparent cells, usually colourless, and consisting of a mass of protoplasm surrounded by a definite wall which is different in character from the cellulose wall of higher plants. Around this wall many B. have a gelatinous covering, which enables them to cohere and form a slimy mass such as may be found on the surface of stagnant water and round flower-stalks which have begun to rot. This cohesive mass is the zooglee (i.e. 'animal glue'). Some B. are coloured, but since the majority are not their structure can be determined only with the aid of appropriate stains, usually aniline dyes. The presence of a differentiated nucleus has not been satisfactorily demonstrated, even in the larger forms, and from results so far obtained it seems unlikely that the cell contains an organised nucleus. The cells may contain food reserves of fat, carbohydrate such as glycogen, and of other materials.

Growth and reproduction. Under favourable conditions a bacterium grows very rapidly, and divides either transversely or longitudinally or in both directions. The new cells grow and divide almost immediately. When conditions become adverse, thick-walled resting spores, endospores, are formed inside the cell, and may rest and remain viable for months, or even years, awaiting the return of favourable conditions. Most B. are not killed unless they are subjected to extreme conditions.

Food and feeding. On account of the inability of all except the chemosynthetic species to synthesise food from carbon dioxide, water, and mineral salts, B. have to live on food manuf. by green plants. In a few cases they do this directly by living within or on parts of the plant. For example, some species live on seeds, and in feeding help to rot the testa and so help the seedling to grow out more easily. Most, however, do it indirectly by living in or on animals and on decaying plant or animal matter. In fact, the B. themselves effect the decay by the chemical decomposition due to enzyme (q.v.) action. These B. are either saprophytes (Gk *sapros*, decay) or parasites, but many of the parasites cause

the death of their 'host' or are expelled, and then go on living as saprophytes. To effect decomposition the B. secrete enzymes or ferments capable of decomposing such substances as cellulose, lignin, protein, and other compounds, and on this account are very useful to man (see below). On the other hand, some parasitic B., by decomposing blood and tissues, may cause great harm and even death. Some parasites are useful; those found in the intestine probably aid digestion.

The elements of food substances required by B. are practically the same as those needed by all plants—carbon, hydrogen, oxygen, phosphorus, sulphur, nitrogen associated with the metals calcium, potassium, and magnesium. Some species need iron, and sodium compounds are present in many. It is difficult to discover in exactly what form B. require these compounds, because any one species of bacterium is rarely found alone. Usually there are associations of sev. species, and each may modify the substratum, while the others may be feeding on materials produced by the modification. Most B. prefer an alkaline medium; even a small amount of free acid will inhibit the growth of the cholera bacillus, and many B. are killed by the hydrochloric acid in the gastric juice of the stomach. By the method of culture it is possible to discover the foods which some B. can use.

Methods and uses of culturing bacteria. In any medium where B. flourish freely there is a confusion of different forms, spherical, cylindrical, and spiral. Some species use up all the available nourishment and die or dwindle into spores. Other species enter and multiply, and are in their turn destroyed through the exhaustion of the food supply or by the poisons created in the medium by other species. The microbe pop. is thus always changing, and it is difficult to study their structure and actions unless each species can be separately collected. This may be done by sterilising a solution of agar-agar (obtained from a Jap. seaweed) to which has been added a food solution of materials similar to those on which the B. grow naturally. The sterilisation is carried out at a temp. which will not decompose the medium, and if it has to be as low as 57° C., sterilisation will take some days. If, however, it can be performed under pressure due to superheated steam, from 20 to 30 min. will be long enough to kill any spores which have found their way into the medium. This is poured into sterilised flat dishes, Petri dishes, or into test-tubes sloped to expose a long slant surface of the agar. In the latter case the medium is usually sterilised in the tubes, which are plugged with cotton wool. If sufficient agar be used the medium sets like a jelly, and is most convenient, because pieces on which B. are growing can easily be removed. Many other media are used for specific B.; the diphtheria bacillus grows on coagulated blood serum and the meningococcus on egg albumen. B. are

scattered on the surface by adding a drop of water or liquid gelatine or by dipping a platinum needle into a mass of B. and quickly stroking it across the medium. If conditions be favourable they divide, and the different types form separate colonies, which may be removed and subcultured separately on fresh media. In this way pure cultures may be obtained and subjected to experiments to determine the effect of changes in temp., light, food, materials, poisons, and other factors. Such researches may be invaluable in determining the most favourable conditions of life for disease-producing B., the means of ending their activities, and also the best conditions for the activities of B. of economic value.

Identification of bacteria. It is not usually possible to identify B. by the use of the microscope alone, though examination of stained preparations is, of course, employed; living B. can be viewed by dark ground illumination, and this method is particularly useful for recognising *Spirochaetes*.

A most important aid to identification is the manner of growth of B. in the pure cultures prepared as described above, and observed with the naked eye. The size, colour, shape, type of surface, and other similar features are all used. Further important methods of identification are: (1) whether gelatine, used instead of agar-agar in the culture medium, is liquefied by the bacterium; (2) whether indole, a substance which can easily be tested for by chemical means, is formed; (3) whether various sugars are fermented by the bacterium, with production of acids, as shown by the colour change of an indicator incorporated in the medium; (4) whether in (3) a gas is formed as a result of the fermentation.

Effect of temperature. Every organism has a temp. which is most favourable to its growth. Above or below this optimum temp. growth decreases until the limits beyond which it cannot take place are reached. These vary considerably, so that while for most B. the lower limit is about 12° C. and the upper about 40° C., a few will grow at 5° C., while those which decompose hay and dung grow well at about 60° C. Beyond the temp. limits endospores are frequently formed, so that though meat may be preserved in a refrigerator and milk by boiling, in neither case is it safe to assume that the B. are killed. Their activities, ended for a time, may be resumed if the endospores have survived and are given suitable conditions. Some B. have been found to survive temps. required to liquefy hydrogen, while the sulphur B. flourish in hot springs at a temp. of 77° C.

Effect of light. As a rule B. are destroyed in a short time by bright sunlight, and in any case develop more rapidly in the total absence of light. Ultra-violet rays have some bactericidal action, and the electric arc, which is particularly rich in blue-violet and ultra-violet rays, has been used with some success in the treatment of lupus (tuberculosis of the skin) by the Finzen lamp.

The action of the rays is limited, however, to the superficial tissues of the body; B. which are more than a centimetre from the surface remain unaffected.

Phosphorescence. On a dark night luminous gleams may be seen on the surface of the sea. These are usually caused by protozoa, such as *Noctiluca* (q.v.), but may also be due to B. living on organisms on the surface of the water or on fish. Other forms of phosphorescent B. are found on dead fish, putrefying meat, decaying wood and vegetables. The exact cause of phosphorescence is unknown, but oxygen is essential for its appearance. If phosphorescent material be put in an atmosphere devoid of oxygen, the light vanishes. Phosphorescence seems therefore to be the direct or indirect result of an oxidation process.

Bacteria and oxygen. Whereas most living organisms can exist for a very limited time without free oxygen, some B. can live only in the absence of this gas. The bacilli causing tetanus (lockjaw), botulism (q.v.) ('meat-poisoning'), and gas gangrene (see GANGRENE) all flourish in the absence of oxygen, and are consequently termed anaerobes. They are found in the active state only in situations where free oxygen is absent, e.g. deep wounds (gas gangrene) or tinned food (botulism), and are destroyed by hydrogen peroxide, which readily liberates oxygen. Other B., aerobes, are unable to live unless oxygen be present, and to this type belongs the bacillus (*B. subtilis*) which is found in an infusion of hay. Many of the disease-producing B. are able to live equally well with or without oxygen.

Bacteria and nitrogen. Among the most important phenomena associated with bacterial action is the way in which the nitrogen of the atmosphere is rendered available for the use of animals and plants. The higher plants are unable to use atmospheric nitrogen until it has first been converted into nitrates by the agency of bacteria. Leguminous plants, such as clover, peas, beans, etc., are so well served in this respect by particular B. that they actually leave the soil richer in nitrogen than when they were sown. The bacterium lives in the root of the plant, and its presence is indicated by the appearance of nodules or tubercles upon the roots. Plants which are affected by this bacterium grow more vigorously than plants grown in sterilised soil and free from nodules. Leguminous plants are therefore an important item in the rotation of crops, and artificial cultures of the B. concerned are prepared so that the plants may be as fully infected as possible and so be able to gain the greatest amount of nitrogen compounds. The bacterium is able to effect the conversion of the nitrogen into ammonium compounds, and then into nitrites and nitrates, which the plant may build into proteins. When the leguminous crops are cut, the roots decay and the nitrates and proteins pass into the soil. Here another group of B. decompose the proteins, breaking them down into ammonium

compounds and sometimes liberating free nitrogen. Some nitrifying B. live in the soil and can carry on the rebuilding process of ammonium compounds into nitrates available for the higher plants. Other nitrifying B. in the soil can build up the free nitrogen into the ammonium compounds. By the activities of these nitrifying and denitrifying B. the amount of nitrogen in the atmosphere is kept approximately constant, and depletion of nitrogen in any one form is prevented. The circulation is known as the nitrogen cycle.

Bacteria in industry. Owing to their power of secreting ferments, B. are of great economic importance. The separation of the fibres of flax is effected by the decomposing action of the B. on the tissues connecting the fibres. Those of jute and hemp are separated in a similar way. B. also play a part in the curing of tobacco, the manu. of vinegar from wine, the decomposition of dung for use as manure, leather tanning, and in the preparation of cream for butter. A bacterium known as *Clostridium* is now employed in the commercial production of acetone and butyl alcohol. Citric acid (for fruit drinks) is formed by a mould, alcohol and glycerine by yeast; both these organisms are closely related to B. Ginger-beer is obtained by fermenting sugar with yeast and a bacterium living in symbiosis. Sour milk may be produced by the action of many different bacilli; one of the best known of these is the lactic acid bacillus which during the fermentation produces the acid from which it is named.

Bacteria and disease. It had long been suspected that suppuration was due to the presence of organisms in wounds and that B. were responsible for many diseases (see PATHOLOGY). For instance, Semmelweis of Vienna had shown the value of washing the hands in chloride of lime as a means of preventing the spread of puerperal fever (see OBSTETRICS). Joseph (afterwards Lord) Lister (q.v.) realised the importance of Pasteur's work on microbes as agents of fermentation, and showed (1867) that suppuration was likewise due to micro-organisms (in this case B.) and could be avoided by killing the germs with antiseptics such as carbolic acid. Finally, Robert Koch (q.v.) isolated and cultured the bacterium which causes anthrax; similar work on other diseases quickly followed. The more superficial diseases due to B. entering wounds are commonly caused by small spherical B., *Streptococcus pyogenes* and *Staphylococcus aureus*. They are constantly present where people are gathered together, especially in sick wards of hospitals and other places where there are persons affected with suppurative inflammation. Childbed fever is caused by the same organisms, and undoubtedly many cases were occasioned by doctors and nurses carrying infection before the origin of the disease was known. The danger has been considerably lessened by the precautions taken to sterilise the hands and instruments used in childbirth

and by the improvement in the standard of midwifery.

Streptococcus pyogenes may produce degrees of inflammation varying from local redness to erysipelas, while *Staphylococcus aureus* is associated chiefly with suppuration. B. infection of the deeper tissues of the wound is more dangerous.

The formation of pus when wounds are infected by B. is due to the action of the leucocytes, or white corpuscles of the blood (q.v.). They are single cells which in ordinary circumstances circulate with the blood-stream, but are capable of penetrating the walls of the blood-vessels into spaces in the tissues. The work they do is the engulfing and digesting of small particles of waste or foreign substances, and they thus serve as scavengers to the blood. When B. enter a wound the corpuscles make their way to the part affected. Here they proceed to ingest the B. but if these multiply more rapidly than the leucocytes can ingest them, they may penetrate to other parts of the body and cause abscesses. If, however, the leucocytes can cope with the bacterial invasions, they help in forming new tissue to heal the wound, from which the dead corpuscles and B. are discharged as a yellowish-white mass known as pus.

Many of the pathogenic or disease-producing B. produce substances called toxins in the tissues or in the blood, and when toxins circulate in the blood-stream a general effect known as toxæmia is caused. In other cases the B. themselves, as well as their toxins, circulate and multiply in the blood, so spreading infection throughout the body and producing the conditions of septicaemia (blood poisoning). The following is a list of some well-known diseases caused by bacterial infection; they are described under their individual headings, to which reference should be made: *Cholera*, *Diphtheria*, *Enteric fever*, *Gonorrhoea*, *Leprosy*, *Meningitis*, *Plague*, *Pneumonia*, *Rheumatic fever*, *Syphilis*, *Tetanus*, and *Tuberculosis*. Many other diseases of an infective nature are caused by viruses, ultramicroscopic bodies which are on the border-line between a living organism and a non-living complex chemical structure. They are usually regarded as being of the nature of living bacteria (see VIRUSES).

Immunity means resistance to infection. Immunity may be inherent or acquired. When it is acquired it may occur as a result of natural means (as from an attack of the disease), or artificially (as from a vaccine or antitoxin). Acquired immunity may be active or passive. The infecting bacterial agent is known as an antigen or toxin, and the agent of immunity is known as an antibody or antitoxin. Individuals and races vary in their susceptibility to bacterial disease, owing probably to some inherited constituents in the blood which render it favourable or otherwise to the development of B. Where individuals are found to be unaffected by injurious germs, they are said to enjoy natural or hereditary immunity. It is also possible to acquire

immunity from a second attack of a disease by the changes induced in the body as a consequence of the first attack. When bacterial poisons (antigens) are produced in the blood, the body cells elaborate certain substances (antibodies) which unite with these toxins and render them harmless. Thus people who recover from infections such as smallpox, measles, scarlet fever, and, to a certain extent, typhoid fever are protected from further attacks for a considerable time. The antibody is usually specific—that is, it is only effective against one particular disease—and considerable progress has been made in the artificial preparation of antibodies to aid the natural resisting power of the body in fighting certain diseases. For example, when a horse is inoculated with the poison produced by diphtheria bacilli, his cells are stimulated to bring forth the appropriate antitoxin. The treatment is continued with larger doses of the toxin as the horse increases his resisting power by production of antitoxin. He is then bled and the serum or clear fluid removed from the blood and used to inoculate diphtheria patients, thus enabling them to combat the disease with greater prospects of success. Similar treatment is applied in cases of tetanus and botulism. Since the serum already contains the antitoxins, the immunity given by it is described as passive and its effects are shortlived. Active immunity is given by vaccines which stimulate the body to produce its own antibodies. Vaccines are emulsions of living or dead germs, or toxoids; that is, toxins which have been rendered innocuous by treatment with chemicals such as formaldehyde. The dead ones are usually obtained by heating the culture sufficiently; living ones are grown under such conditions that their vitality is impaired, so that when injected into the body they may readily be overcome by the leucocytes. The antibodies formed usually remain in the body for some considerable time.

Both serums and vaccines may be used in prophylactic as well as in curative treatment. When the antibodies disappear from the blood re-injection is necessary to preserve immunity. In vaccinations against smallpox (Jenner, 1798) the antibodies probably persist throughout life, though not in sufficient quantity to prevent an attack, but they probably never lose their power to modify it. For prevention, revaccination is necessary from time to time. The original anthrax vaccine (Pasteur, 1880) was efficacious for only 1 year. Immunity for a longer period is given by the anti-anthrax sera now used. Jenner and Pasteur were the pioneers in vaccine treatment; epidemics and war conditions have stimulated research, with the result that various vaccines have been discovered and are prophylactic against typhoid and paratyphoid fevers, plague, dysentery, cholera, and many other infections. The most notable advances in recent years in the use of prophylactic vaccines have been in those against tuberculosis (q.v.) and poliomyelitis (q.v.).

Also present in the blood serum are substances called *opsonins* (q.v.) which assist the leucocytes (see BLOOD) in their phagocytic action on B. Inoculation of a vaccine of dead B. at first decreases the power of opsonins. This 'negative phase' is followed by the permanent 'positive phase' in which the opsonic power is increased. Opsonins therefore play a part in immunity but different from that of the antibodies.

Bactria, prov. of the anct Persian Empire, bounded on the N. by Sogdiana, on the E. by Parthia, and on the S. by Aria, Drangiana, (see BLOOD) in their phagocytic action on B. Inoculation of a vaccine of dead B. at first decreases the power of opsonins. This 'negative phase' is followed by the permanent 'positive phase' in which the opsonic power is increased. Opsonins therefore play a part in immunity but different from that of the antibodies.

Bactrian Coins (from the anct dist. called in Greek *Bactria*) have been found in the 'topes' or burial-places to the NE. of Kabul. These coins are also known as Indo-Greek or Indo-Scythian. They belong to the period between 175 BC and the 1st cent. AD. They are inscribed in the Kharoshthi script, which probably originated from the Aramaic script in the 5th cent. BC, and was formed in NW. India, at that time under Persian rule, this rule being the best medium for the spread of the Aramaic speech and script. The great importance of the Kharoshthi script was realised after the discovery, in 1836, of a Kharoshthi inscription incised on a rock in the vicinity of Shahbazgarhi (on the Indo-Afghan border) giving a trans. of Asoka's edicts, attributed to 251 BC. Dr Isaac Taylor suggested that the present 'Arabic' numerals are the actual symbols of Kharoshthi letters found on the B. C. e.g. 4 is the letter *ch* (Indian *chatur* = Latin *quatuor*), 5 is *p* (Indian *panchan* = Greek *pentē*).

Bactris (Gk *baktron*, staff), genus of Amer. palms of small size, with slender stems which are much used in making light but solid walking-sticks. *B. maraja* produces a small fruit of pleasant taste; *B. acanthocarpa* a fibre used in making nets.

Bacup, industrial municipal bor. and mkt tn of the Rossendale div. of E. Lancs, England. The industries embrace cotton-spinning and weaving, shoe and slipper manuf., textile finishing (bleaching, printing, etc.), felt manuf., the making of overalls, shirts, underwear, and knitted goods, coal-mining, stone-quarrying, heating and ventilating, and other light engineering, printing, etc. Pop. 18,370.

Bad Aussee, see AUSSEE, BAD.

Bad Ems, see EMS.

Bad Ischl, see ISCHL, BAD.

Bad Nauheim, see NAEHEIM.

Badagry, dist. and tn on R. Badagry in

Nigeria, W. Africa. It does a considerable trade in palm-oil and palm kernels.

Badajoz: 1. Sp. prov., in Estremadura (q.v.), the largest prov. in Spain. It is watered by the Guadiana (q.v.) and its tribs., and is, in general, low-lying. The chief industry is stock-raising. Area 8358 sq. m.; pop. 835,200.

2. (Rom. *Pax Augusta*, later *Batalyoz*) Sp. tn, cap. of the prov. of B., on the Guadiana. It was originally a Celtic settlement, then a Rom. tn, and, under the Visigoths, was the seat of a bishop. In 1031 it became the cap. of a Moorish kingdom. Portuguese in the 12th cent., it was taken by Alfonso IX (q.v.) in 1229. It was besieged by the Portuguese in 1385, 1396, 1542, and 1705, and by the French in 1808 and 1809. It surrendered to Soult (q.v.) in 1811, but was captured and pillaged by Wellington's army in the following year (see *PENINSULAR WAR*). During the Civil war it was taken by the insurgents in Aug. 1936. B. is built on a hill, crowned by a ruined Moorish castle. It has a 13th-cent. cathedral, fortress-like in appearance, and a 16th-cent. bridge. Textiles, pottery, leather, and soap are manuf. Luis Morales and Manuel Godoy (qq.v.) were b. here. Pop. 86,550.

Badakhshan: 1. Gorno-Badakhshan Autonomous Oblast (prov.) of the Tajik S.S.R. of the Soviet Union. The cap. is Khorog. The pop. of 45,000 is composed of Tajiks and Kirgiz. The E. section forms a plateau with an elevation of 11,500-13,000 ft. The chief crops are grains and beans. Vegetables and fruit have recently been introduced.

2. Minor prov. of N. Afghanistan adjoining 1. The cap. is Faizabad. Its frontier with Russia was delimited in 1873.

Badalocchio, Sisto (c. 1581-c. 1650), surnamed *Rosa*, b. Parma, an It. painter and engraver, pupil of Annibale Carracci (q.v.), whom he and a co-disciple, Lanfranco, accompanied to Rome in 1606. His prin. engravings are the series known as *Raphael's Bible*, which were executed by him in conjunction with Lanfranco. On the death of Carracci, 1609, he went to Bologna, where he d.

Badalona, Sp. port in the prov. of Barcelona, a N. suburb of the city of Barcelona (q.v.). It has a shipbuilding industry, and manufs. textiles and glass. Pop. 55,800.

Baden, spa in the canton of Aargau, Switzerland, on the bank of the R. Limmat. Famous for its sulphur baths (the *Aquae Helveticae* of the Romans), which reach a temp. of 117° F. From the 15th to the 18th cent. it was the seat of the Swiss diet. Pop. 12,000, but visited yearly by 20,000 persons.

Baden, ter. in Germany, lying between Alsace-Lorraine and Württemberg (qq.v.). It was a state of the Reich from 1918 until 1945, and it now forms part of the *Land* of Baden-Württemberg (q.v.). Its early inhab. were the Alemanni (q.v.), who were conquered by Clovis I (q.v.) in 496 and converted to Christianity. In 748 Pépin the Short (q.v.) abolished the dukedom of Alemanni. In the 12th cent. a margravate

of B. was founded, but was frequently split between various branches of the ruling house of Lähringen; it was finally united under the margrave Charles Frederick in 1771. Charles Frederick joined the Confederation of the Rhine (q.v.), and in consequence doubled his estates, and gained the title of elector and grand duke. In 1811 he was succeeded by his grandson Louis Frederick, who seceded from the Confederation. The rule of the Grand Duke Leopold began in 1830 with political feelings in B. inflamed by the events of the Fr. Revolution of that year; and, although by 1846 it seemed that a peaceful solution might be found under a Liberal regime, in 1848, the 'Year of Revolutions,' Hecker and Struve drove out the grand duke and estab. a rep. The grand duke was reinstated by the Prussians in the following year, but in the war of 1866 (see *AUSTRIA, History*) B. favoured Austria. In the Franco-Ger. War (q.v.), however, B. fought on the side of Prussia, and became part of the new Ger. Empire. At the end of the First World War the grand duke, though personally popular, was forced to abdicate, and in 1919 a republican constitution was framed. At the end of the Second World War B. was partitioned: the S. part became a *Land* (called B.) in the Fr.-occupied zone; and the N. part, together with parts of Württemberg (q.v.), became a *Land* called Württemberg-Baden in the U.S. zone. In 1952 the *Länder* of (Fr.-occupied) B., Württemberg-Baden, and Württemberg-Hohenzollern were merged to form the present *Land* called Baden-Württemberg.

B. lies on the E. bank of the Rhine (q.v.), in the angle of the riv. forming the Ger.-Swiss border. It contains the Black Forest (q.v.), and is mountainous except for the part lying in the valley of the Rhine. Part of Lake Constance (q.v.) lies within its borders, and it has many mineral springs. Coal, gypsum, zinc, salt, and soda are found, live-stock is raised, and cereals, fruit, vegetables, wine, and tobacco are produced. There are light industries, including the manuf. of chemicals, china, glass, and textiles. The area of the state of B. was 5823 sq. m.; cap. Karlsruhe (q.v.).

Baden-Baden, Ger. spa in the *Land* of Baden-Württemberg (q.v.), in the Oos valley, 43 m. W. of Stuttgart (q.v.). The mineral springs (115°-150° F., containing iron, magnesia, lime, and sulphur) were known to the Romans, and the ruins of Rom. baths still exist. The great days of the spa were in the 19th cent., when it was one of the most fashionable in Europe: the hydropathic installations are still to-day, however, much frequented, and they are the finest in Germany. The tn has beautiful walks and gardens. The ruined 'Old Castle' on the Schlossberg was destroyed by the French in 1689, as was the 16th-cent. 'New Castle'; the latter has been restored and is now a museum. There are sev. notable churches, a theatre, and an art gallery, and there are sporting facilities of all kinds. The *Kurhaus* (casino) was once famous. Pop. 40,000.

Baden-bei-Wien (Baden near Vienna), Austrian spa, in the prov. of Lower Austria, 16 m. S. of Vienna. It was known to the Romans as *Aquae Panonicae*, and has sulphur springs. Pop. 24,000.

Baden-Powell, Robert Stephenson Smyth, Baron Baden-Powell of Gilwell (1857-1941), Eng. soldier, b. London, son of the Rev. Prof. B.-P. of Oxford. He had for godfather Robert Stephenson, son of the 'father of railways'; and his mother was descended from Capt. John Smith (1579-1631) of Virginian fame. Until he was nearly 12 he lived an outdoor life; then he went to a preparatory school, and in 1871 (with his younger brother) to the Charterhouse. He joined the 13th Hussars in 1876, with which he served in India, Afghanistan, and S. Africa. Assistant military secretary in S. Africa, 1887-9, in Malta, 1890-3; commander of the native levies in Ashanti, 1895; served with distinction in the Matabele campaign, 1896-7; raised to the command of the 5th Dragoon Guards, 1895. In the Boer War he won great popularity by his brilliant defence of Mafeking; in spite of famine and sickness, with a force of 1200 men he held the town for 215 days, till its relief on 18 May 1900. In recognition of his ability he was raised to the rank of major-general; inspector-general of the S. African constabulary, 1900; inspector-general of the cavalry, 1903-7. Always interested in boys and their welfare, he had written, some years prior to his retirement from the Army in 1910, his *Aids to Scouting*, which was eagerly read by large numbers of boys. The first experimental camp of Boy Scouts on Brownsea Is., Poole Harbour, in 1907 was so successful that B.-P. decided on more extensive operations, which spread rapidly in Britain and other countries and eventually formed the worldwide Boy Scout organisation which has played a great part in the physical and moral development of youth in all countries. A parallel organisation among girls—the Girl Guides—was founded in 1910. In the Boy Scout movement he was Chief Scout. He was knighted in 1909 and raised to the peerage in 1929. Exhibited sculpture in the Royal Academy, 1907. Lieutenant-general commanding Northumbrian Territorial Div., 1908; retired, 1910; O.M., 1937. He d. on 8 Jan., at his home in Kenya. Among his pubs. are *Pig-sticking or Hog-hunting*, 1889 (revised ed., 1924), *Vedette*, 1890, *Cavalry Instruction*, 1895, *The Matabele Campaign*, 1896, *Sport in War*, 1900, *Scouting for Boys*, 1908, *Quick Training for War*, 1914, *My Adventures as a Spy*, 1915, *Indian Memories*, 1915, *The Wolf-Cubs Handbook*, 1916, *Girl Guiding*, 1917, *Aids to Scoutmastership*, 1920, *Old Wolf's Favourites*, 1921, *What Scouts can do*, 1921, *Rowing to Success*, 1922, *Life's Snags*, 1927, *Scouting and Youth Movements*, 1929, *Lessons from the Varsity of Life*, 1933, and *Adventuring to Manhood*, 1937. See E. E. Reynolds, *Baden-Powell*, 1942.

Baden-Württemberg, Land of SW. Ger-

many, in the Federal Rep., formed in 1952 by the merger of the *Land* of Baden (q.v.), Württemberg-Baden, and Württemberg-Hohenzollern (see WÜRTTEMBERG). The chief towns are Stuttgart (the cap.), Karlsruhe, Mannheim, and Heidelberg (qq.v.). Area 13,925 sq. m.; pop. 7,077,300.

Badenoch, dist. in the SE. of Inverness-shire, Scotland, 45 m. in length and 19 m. in breadth, traversed by the R. Spey. Gneiss rock and granite are found.

Badenweiler, Ger. spa in the Land of Baden-Württemberg (q.v.), near the Fr. border, 97 m. SW. of Stuttgart (q.v.). It is near the Black Forest (q.v.) and its springs have been known since Rom. times. Pop. 2000.

Badgastein, Austrian tn in the Gastein valley (q.v.). It is a fashionable resort, and the most important spa in Austria, with radioactive thermal springs. Pop. 5600.

Badge, device used as a distinctive emblem of families, countries, etc. It is a simpler and more primitive cognisance than the crest or coat of arms, and is not subject to the laws of heraldry. B.s, like crests and coats of arms, are usually symbolic in character, but on the one hand are distinct from the coat of arms as not being supported on a shield, and on the other hand are distinct from the crest as not surmounting a helmet. Famous Eng. B.s are the *rose en soleil* of Edward IV, the falcon and fetlock of Richard, Duke of York, the ragged staff of the Beauchamp and Neville earls of Warwick. B.s are also worn as signs of office, or as a token of membership of some society, e.g. Solomon's seal and the mason's tools used as an emblem by Freemasons, and the primrose used as a B. by members of the Primrose League. B.s are used by savage peoples to identify their arms and mark their belongings.

Badger (*Meles*), genus of burrowing carnivores, constituting with the skunks the sub-family *Melinae* in the *Mustelidae* or weasel and otter family. Its chief characteristics are short, strong legs, long and more or less plantigrade feet, and a pointed muzzle. It has perineal glands containing a substance emitting a fetid odour, which is thought to be of use in sex attraction. The common B. (*M. meles*) is found in the hilly and woody dists. of Europe and Asia, but is now comparatively rare in Great Britain. Its colour is greyish-brown, with a white head marked with black lines running from the nose to the back of the ears. It is about 2 ft 6 in. long, and stands 1 ft high. It is an inoffensive, solitary animal, sleeping by day in subterranean burrows which it digs for itself, and wandering by night in search of its food, which consists of roots, insects, frogs, and the larvae of wasps and bees. The Amer. B. (*Taxidea americana*) is more carnivorous, and eats small animals such as marmots. B.s are conspicuous for their shrewdness, perseverance, and courage. The cruel practice of B.-baiting, or drawing the B., was prohibited in England in 1850. A B. was kept in a barrel and attacked

by dogs until it at last gave way and was dragged out. Then its owner released it from the dogs and put it back into the barrel to recover itself. This performance was continued during the day, and formed an attraction at public-houses of a low order. The verb 'to badger,' meaning to assail repeatedly, to worry, is derived from this practice.

Badger, George Percy (1815-88), Arabist, b. Chelmsford, Essex. Travelled in Arabic lands and acquired an unrivalled practical knowledge of Arabic dialects, and an intimate knowledge of the Near E. Gov. chaplain at Bombay, 1845. Joined Sir James Outram's expedition to Aden, 1854; when Outram became Commander-in-Chief of the Persian expedition (1856), B. became his staff chaplain and Arabic interpreter. In 1872 he was secretary to Sir Henry Bartle Edward Frere on mission to Zanzibar. Author of *Malta and Gers*, 1838 (2nd ed.), 1851, *The Nestorians and their Rituals* (2 vols.), 1852, *The State of the Dead* (2nd ed.), 1871, *The Syriac Liturgies*, 1875, and *An English-Arabic Lexicon*, 1881.

Badger-baiting, see BADGER.

Badger State, see WISCONSIN.

Badghiz (home of the winds), dist. in the NW. of Afghanistan, bounded by the Murghab and Harirod R.s.

Badia-y-Lablick, Domingo (1766-1818), Sp. traveller, b. Barcelona. He studied Arabic language and life, and he disguised himself as a Mussulman, calling himself Ali-Bei. His disguise was perfect, and he was invited to the court of the Sultan of Morocco, where he was held in high esteem. Two years later he went on a pilgrimage to Mecca, and there performed all the rites. At Paris he pub. an account of his adventures under the title of *Voyage d'Ali-Bei en Afrique et en Asie*.

Badius, Jodocus, or Jose (1462-1535), Fr. printer, b. Assche, near Brussels, and therefore sometimes called Ascensius. He studied at Ghent, Brussels, and Ferrara, and taught Greek at Lyons and Paris. Trechsel, a printer, engaged him as corrector of his press, and afterwards as a son-in-law secured his services as a partner. In 1500 he settled in Paris and estab. a printing office that went by the name of Prolum Ascensianum. He also wrote books, which include a life of Thomas à Kempis; *Sylva moralis contra vitia: Navicula stultarum mulierum*, a satire on the follies of women.

Badland Topography, term used to describe ground crossed by numerous gullies which have the effect of making the land uncultivable and very difficult to cross. B. T., called after the type locality in N. America (q.v.), is the result of the rapid erosion of soft beds and usually occurs where high seasonal rainfall or a lack of vegetation makes the run-off of rain-water very intense. In these circumstances a network of gullies may spread rapidly over once fertile land. Soil conservation and the cultivation of suitable crops are now practised to restrict the development of such gullies. See also BADLANDS.

Badlands, great stretches of waste and rugged country in the W. of the U.S.A.

Such regions are found in S. Dakota, SW. N. Dakota, and Nebraska, on the White R., the Bad, the Yellowstone, and the Little Missouri. Their chief interest is zoological, as they contain valuable fossil specimens.

Badminton, or Great Badminton, vil. of Glos., England. (Pop. 338.) Here is the seat of the Duke of Beaufort, B. House. It is an imposing mansion in the Palladian style of architecture, surrounded by fine grounds. B. House has given a name to the game described in the following article, to a kind of claret cup, and to the B. Library.

Badminton, rackets game invented about 1870 at Badminton House, the seat of the Duke of Beaufort in Glos. Since the end of the First World War it has spread to all parts of the world, and its overall organisation is governed by the International B. Federation, formed in 1934, and now having 32 national organisations in full membership. Except in such countries as Malaya, where there is a negligible amount of breeze, it is essentially an indoor game played mostly during the winter.

The missile used is a shuttlecock which weighs only between 73 and 85 grains, the actual weight selected being dependent upon climate and hall atmosphere. The shuttlecock is made from a half-sphere of cork about 1 in. in diameter with the rounded end being covered with leather. Into the flat end are inserted 14 to 16 goose feathers, each cut to measure from $2\frac{1}{2}$ to $2\frac{3}{4}$ in. in length from the tip to the cork base. They are fixed so that there is an outward spread of $2\frac{1}{2}$ in. at the top. They are firmly fixed into the cork with thread and glue.

Rackets are not dissimilar to lawn tennis rackets, though less wide and much lighter in weight. They weigh about $5\frac{1}{2}$ oz., though they are exceptionally strong and whippy. They are strung with gut, and the frame is usually made of hickory, though metal shafts have become very popular.

The doubles court, upon a restricted area of which singles is also played, is 44 ft long and 20 ft wide with a net across the middle. The net, $2\frac{1}{2}$ ft deep, hangs exactly 5 ft above the floor at the centre and 5 ft 1 in. at the posts, which are themselves that height. The lines of the court, as shown in the diagram (p. 672), are $1\frac{1}{2}$ in. thick and painted in either white or black. Except for marking the extremities of the whole court, they denote only the restrictions imposed upon the server and receiver at the commencement of each rally.

The singles game, for 1 player a side, is played within the narrower side-lines, so that the total width of the court becomes reduced to 17 ft, the length remaining the same. Where space does not permit the marking of a doubles court, singles can be played on a court marked out in accordance with diagram 2. There is no specification for the height of the court, but this should be at least 25 ft. Anything less will prevent exposition of the full range of strokes which varies from

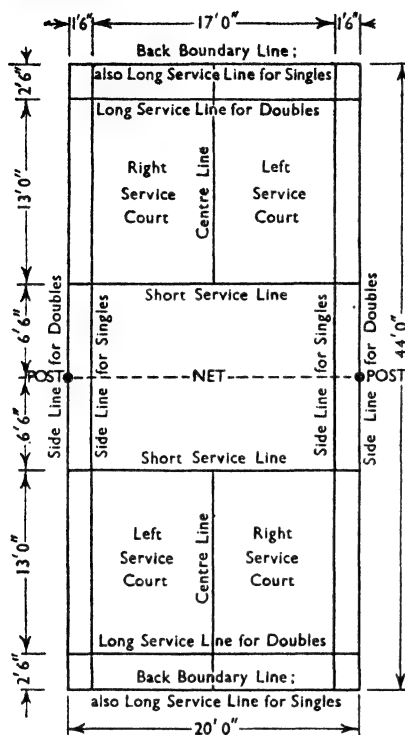


FIG. 1. DOUBLES COURT

Diagonal measurement of full court: 48 ft 4 in. Diagonal measurement of half court: 29 ft 8½ in. (from post to back boundary line).

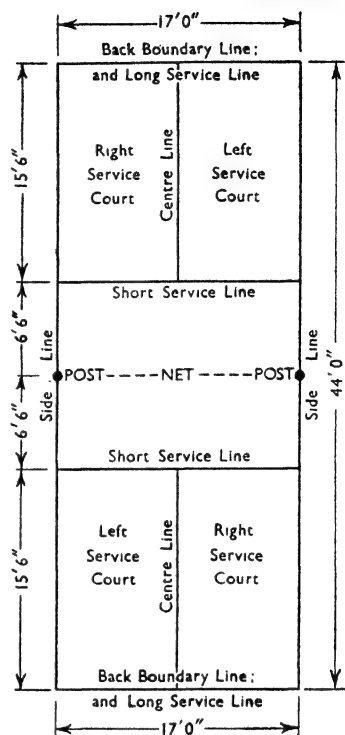


FIG. 2. SINGLES COURT

Diagonal measurement of full court: 47 ft 2 in. Diagonal measurement of half court: 27 ft 9½ in. (from post to back boundary line).

high and deep clears, designed to fall almost vertically on the back line, to very close and delicate net shots. Prominent strokes include the smash, which can well exceed an initial velocity of 60 m.p.h., and drop shots, hit from any part of the court, which fall just over the net. All strokes have to be made on the volley, and this fact makes the game an exhausting one, for shots have to be hit from overhead, as for instance with the smash and most clears, as well as from just off the floor. Great accuracy is necessary for success, and wrist power rather than arm power is the main impelling force.

The doubles and men's singles game consists of 15 or 21 points, though 21 is now rarely resorted to. Only the server, or in doubles the serving side, may add to his score, so that a game may frequently consist of 50 or 60 rallies before one side

has reached the score of 15. It having been decided by toss which side shall commence serving, the first service is hit from the right service court to the diagonally opposite service court; server and receiver must stand in their service courts without moving until the shuttle is served. Thereafter there are no restrictions on any player in so far as court position is concerned.

If the server, or serving side, wins the first rally, the same server will continue to serve, but from the left service court to the diagonally opposite service court, and so on until he loses a rally. Whenever the server, or his side, wins a rally he will advance his score by 1 point; if he loses a rally the score remains static, but the service changes as previously stated.

In doubles each partner has a 'hand,' by which is meant the right to serve

consecutively. Upon winning a rally, the server and his partner change sides so that the service is alternately delivered from each service court. When the server loses his 'hand,' the players do not change sides. At the beginning of each game the serving side has only 1 'hand,' and the winner of the previous game will always serve first in the succeeding game. A match is the best of 3 games, and the players change ends at the commencement of a new game, and also when the leading side's score reaches 8 in the third, or final, game.

When the score reaches 13-all, the side which first reached 13 has the option of 'setting' the game to 5 additional points, or of adhering to the original 15. If 'setting' is chosen, then the score is called 'love-all' and the side which first reaches 5 wins the game. At 14-all the game may be similarly 'set' to 3 points.

In ladies' singles the game consists only of 11 points; ends are changed at 6 in the final game, and the score may be 'set' to 3 at 9-all, or to 2 at 10-all.

Throughout a rally it is a fault if (a), in serving, the shuttle be hit when it is higher than the server's waist or if any part of the head of the racket be higher than any part of the hand holding the racket; (b) if, in serving, the shuttle falls outside the confines of the diagonally opposite service court; (c) if the server's feet or the receiver's feet are not both stationary and within the confines of the appropriate service court; (d) if before or during the delivery of the service either player makes preliminary feints; (e) if, when in play, the shuttle falls outside the boundaries of the court, fails to pass the net or hits the person of any player; (f) if the shuttle be not cleanly hit, be hit twice in succession by the same player or his partner, or if it be struck with the frame, shaft, or handle of the racket. There are also other infringements, such as invasion of opponent's court and obstruction of an opponent. See Sir George Thomas, *The Art of Badminton*, 1931; N. Radford, *Badminton*; K. R. Davidson and L. R. Gustavson, *Winning Badminton*, 1936; J. F. Devlin, *Badminton for All*, 1936; Betty Ueber, *That Badminton Racket*, 1950.

Badoc, tn of Luzon, Philippine Is., in the prov. of Ilocos Norte and about 20 m. SW. of Laoag. Pop. 13,573.

Badoglio, Pietro (1871-1956), It. marshal, Marquess of Sabotino and Duke of Addis Ababa, b. Sicily. He served in Tripoli in the Italo-Turkish war. In the First World War he commanded a corps at Caporetto (q.v.) and took a leading part in reducing the stronghold of Gorizia (q.v.). B. was Governor-General of Libya, 1928-33, and succeeded de Bono as Commander-in-Chief of the It. Army invading Abyssinia late in 1935, bringing the war to a successful conclusion in the spring of 1936. Later he was Viceroy of Abyssinia, but resigned and was given a dukedom. In Dec. 1940, during the Italo-Gk war, he was dismissed from his post as chief of the general staff. On the fall of Mussolini he became Prime

Minister (July 1943) and subsequently signed an armistice with the Allies. He resigned in June 1944 and was expelled from the Senate in 1946 because of his help to Fascism in the past.

Badrinath, group of mts in the Garhwal Himalaya; highest peak, 23,420 ft. Its glaciers are regarded by Hindus as the source of the holy R. Ganges, and as such it is visited annually by some 80,000 pilgrims. The vil. of Badrinath, with a famous temple and hot spring, stands at 10,000 ft on its E. flank.

Baacia, see BAEZA.

Baada, see BEDE.

Baedeker, Friedrich (1844-1925), Ger. publisher, son of Karl B. Became head of his father's business in 1878. Largely responsible for the accuracy in style of the famous B. guides, the scope of which he extended by embracing in them descriptions and information about countries outside Europe.

Baedeker, Karl (1801-59), Ger. publisher and writer, b. Essen, where his father carried on business as a bookseller. He started a bookshop at Coblenz (where he d.) in 1827. His fame rests chiefly upon his excellent series of guides. The first guide he pub. was a handbook on the Rhine. B. guides came to be considered the most reliable series in the market. They have been trans. into many languages, the first Eng. ed. appearing in 1861. The business was removed to Leipzig in 1872.

Baekeland, Leo Hendrik (1863-1944), Amer. chemist, b. Ghent, Belgium. Associate prof. of chem., univ. of Ghent, 1882-9, and later prof. of chem. and physics, Bruges. Went to U.S.A., 1889, and was afterwards engaged in chem. research. Collaborated in developing Townsend electrolytic cell for big power company, Niagara Falls. Member of Naval Consulting Board, 1915. Awarded Nichols medal of Amer. Chemical Society, 1909; John Scott medal, by Franklin Institute, 1910; Perkin medal for industrial chemical research, 1916; grand prize, Panama Pacific Exposition, 1915, and many others, in recognition of his work in organic chem., electrical insulation, and electrolysis. He was the inventor of the substance bakelite (q.v.) and held many patents in the U.S.A. and in other countries on the subjects of organic chem., electric insulation, synthetic resins, plastics, etc. He contributed to numerous pubs. on photo-chem., electro-chem., patent reform, and also on social and philosophic subjects.

Bael, or **Bhel** (*Aegle marmelos*), Indian tree prized for its fruit, which is of the orange order. The ripe fruit is agreeable, and the unripe fruit may be dried and used as an astringent. Yellow dye is derived from the rind.

Baena, Sp. tn in the prov. of Córdoba. It has a castle and ruined walls, and near by is a castle which belonged to Gonsalvo di Cordova (q.v.). There is an agric. trade. Pop. 18,000.

Baer, Karl Ernst von (1792-1876), Ger. zoologist, b. Plep in Estonia. His studies and researches in embryology

resulted in his discovery of the human ovum on which he wrote a treatise *Epistola de Ovi Mammalium et Hominis Genesi*. His next great work was his *History of the Evolution of Animals*. This book explodes the animalculist theory and proves that the Graafian follicles in the ovary are not eggs, but the real ovum is the spherical vesicle contained by them. He then traced the development of the fertilised egg and the order of the appearance of the organs of the body. B. was appointed librarian of the Academy of Sciences at St Petersburg in 1834. He made studies of the fish of the Baltic and Caspian seas. Towards the end of his life he pub. his autobiography. The work of B. influenced Huxley and Spencer, and he is regarded as the founder of comparative embryology.

Baerle, Caspar van, see BARLAEUS.

Baetis, one of the 3 provs. into which Augustus divided Hispania, the Sp. peninsula. The other 2 were Tarracensis and Lusitania. B., called after the R. Baetis (= Guadalquivir), was separated from Lusitania by the R. Anas (= Guadiana), and from Tarracensis by an imaginary line drawn from the Anas to the promontory Charidemus in the Mediterranean.

Baeyer, Johann Friedrich Wilhelm Adolph von (1835-1917), Ger. chemist, b. Berlin, d. Munich. Studied chem. and physics under Bunsen and Kekulé; prof. of chem. at Strasburg (1872). From 1875 he lectured at the univ. of Munich. He was awarded the Nobel prize in 1905. He was a leading authority on the chem. of indigo and made valuable contributions to the knowledge of theoretical chem. He was the inventor of aspirin (q.v.).

Baeza (Rom. *Baetica*; later *Bayesa*), Sp. tn in the prov. of Jaén. It was a flourishing city under the Moors, but was sacked in 1228 by the Castilians. There is a Gothic cathedral, and there are sev. other fine churches. B. had a univ. 1533-1807. Pop. 18,000.

Ba-Fan, see FANS.

Baffa, see BAFFO.

Baffin, William (1584-1622), Eng. explorer and navigator. Accompanied James Hall on a voyage in search of the NW. passage, when for the first recorded time long. at sea was determined by astronomical observation. In 1613 he commanded a whaling fleet to Greenland, and in 1615 he was the pilot of the *Discovery* under the leadership of Robert Bylot, when the bay now called by his name was discovered. He was killed at Kismis, near Ormuz, in 1622, whilst engaged in an Eng. expedition acting in conjunction with the Persians to drive the Portuguese out of the Persian Gulf.

Baffin Bay, sea passage extending between N. America and Greenland. It communicates with the Atlantic Ocean by Davis Strait and with the Arctic Ocean by Smith Sound and Lancaster Sound. It is about 800 m. long, with a mean breadth of 280 m. It was called after Wm Baffin (q.v.).

Baffin Island, lying W. of Greenland, called after Wm Baffin (q.v.). The coast is

mountainous and inhabited by Eskimoes. The interior is also mountainous, containing ice-caps and glaciers. Area 231,000 sq. m.

Baffo, or **Baffa** (a Venetian corruption of Paphos), seaport in the W. of Cyprus, an important tn in Rom. times (Acts xiii). See PAPHOS.

Bafulade, Fr. military station in the Sudan, on the R. Senegal, W. Africa. It has a large fort, and is of commercia importance. Pop. 1700.

Bagamoyo, seaport and trading settlement in Tanganyika Ter., lying in lat. 6° 26' S. and long. 38° 55' E., 36 m. to the NW. of Dar-es-Salaam. Prior to the construction of the railways B. was the chief starting point for the interior. It was once the centre of the Arab slave trade, since the suppression of which and the construction of railways it has been eclipsed by Dar-es-Salaam. Burton, Speke, Stanley, and other explorers took it as their starting point for the interior. It is the seat of a Rom. Catholic bishopric and there is a Fr. mission. In 1873 the remains of Livingstone were brought here by natives disguised as a bale of merchandise on account of the superstition of tribesmen whose ter. they traversed.

Baganda, see BUGANDA.

Bagaria, see BAGHERIA.

Bagasse (Fr.), sugar trash; crushed stalks of the cane after the juice has been expressed. Used as fuel.

Bagatelle (Fr., from It. *bagatella*, a trifle): 1. Thing of no importance.

2. Game, possibly derived from billiards. It is played with balls on a board or table varying in size from 6 ft by 1½ ft to 10 ft by 3 ft. The bed, either slate or wood, is covered with green cloth, and has at its upper end 9 numbered cups to receive the balls. Round the sides there is an indiarubber cushion. The balls used are 9 in number, generally 1 black, 4 red, and 4 white; the black ball is placed on a spot about 9 in. in front of the first hole, and at the player's end, about 18 in. up, there is a balk line, with another spot behind it from which to start play. These measurements vary with the size of the table. The balls are struck with a cue, as in billiards, and the object is to drive them into the holes, the black ball counting double. There are sev. forms of B., the most usual being: (a) Ordinary B. In this game each player sends all the balls up; no score is allowed until the black ball has been touched. (b) Fr. game. Two players, or 4 in partnerships, take part, playing alternately. The rules as to scoring vary slightly in different forms of this game. (c) Cannon game. This more resembles billiards, and may be played with either cups or pockets, or both. (d) Mississippi. Played with a bridge having 9 or more numbered arches (according to the size of the table), through which the balls must be played off the cushion.

Bagdad, or **Baghdad**: 1. One of the 14 provs. (*lieva*) of Iraq. The country is watered by the Euphrates and the Tigris, but the soil is, in general, poor and unproductive. There is a mixed pop. of

Turks, Arabs, Jews, Armenians, and Kurds numbering 800,000. Cap. Bagdad.

2. (Persian 'given by God') Cap. of Iraq. There was a tn near the site in Assyrian times and a settlement with this name when the Abbasid caliph Mansur built his new cap. on the W. bank of the Tigris, 762-6, and called it Mansuriya. As it was the cap. of the biggest empire of that time it grew quickly and before long the palaces of the caliphs and grandees were on the E. bank, the 2 parts of the city being joined by bridges of boats, 1, 2, and 3 at different times. At the height of its glory the total area was about 20 sq. m. including 22 ac. of cemeteries; in 1900 the total area was 737 ac. Hulagu captured the city in 1258, putting an end to the caliphate, and in 1393 Timut captured it. In the 16th cent. the Persians held it for a time and they and the Turks fought for it till the Ottoman Murad took it in 1638 and held it. In 1755 a Brit. trade agency was estab. there and the telegraph was introduced during the rule of the reforming governor, Midhat Pasha. B. was brought into world politics by the B. Railway (q.v.), which was begun at Haidar Pasha in 1871 and reached Konia in 1896, though through traffic to B. was not possible till 1940. The city built by Mansur has vanished entirely and few old buildings, which were built of brick, remain: part of the Mirjaniya mosque and college (14th cent.), the Mustansiriya college (13th cent.); it was used as a customs house but has now been repaired), the Aquliya mosque (13th cent.), and the minaret of al-Ghazi. In or near B. are some venerated shrines: Kadhmain, the burial place of 2 imams, the tomb of Aby Hanifa the jurist, and the shrine of Abd al-Qadir al-Jilani. Jews made pilgrimages to the tomb of Joshua. Midhat Pasha threw down the city wall but left two gates standing, and the remains of a late Abbasid palace still exist. B. has spread N. and S. and the new quarters are W. in their lay-out. Two steel bridges span the Tigris and a combined road and rail bridge is now in use. The bazaars in the old tn are crowded and picturesque and the new parts, built about 1920 to replace what was destroyed by a fire, are a testimony to the skill and taste of modern workmen. Pop. 550,000, Arabs, Persians, Armenians, Kurds, and Christians; most of the Jews have left. See G. Le Strange, *Baghdad during the Abbasid Caliphate*, 1924.

Bagdad Pact, defensive and economic pact, so-called because it was first signed at Bagdad between Turkey and Iraq in Feb. 1955. Subsequently Britain (April), Pakistan (Sept.), and Persia (Nov.) signed the B. P. Its existence provided a centre of relative stability in the Middle E. and Britain's adherence is notable. But it aroused the hostility of the more militant members of the Arab League, and attempts to secure Jordan's adherence resulted in riots in Amman which heralded the downfall of Brit. influence there. After Anglo-Fr. intervention in Suez, the Moslem members of the pact met without Britain: but by

1957 there were signs that Brit. active participation in the pact was again being considered by them. The United States had throughout refused to join the B. P., though expressing interest.

Bagdad Railway. The B. R. or Euphrates Valley Railway was a scheme for a line from Konia, in Anatolia, to Bagdad and thence to Basra on the Persian Gulf. Although by an agreement of 1903 the line, then only just begun, had been placed under international control, Germany aimed to use it as an instrument to destroy the value of the Suez Canal and assist German domination of the Middle E. This ambition was frustrated by the events of the First World War. The lines then built by the Brit. Army in Mesopotamia formed the basis of the present Iraqi State Railways which in 1940 were connected with those of Syria, following the intended route of the B. R. and realising at last the object of the promoters of that project to establish through communication by rail between Europe and the Persian Gulf.

Bagé, city in S. state of Rio Grande do Sul, Brazil, on the R. Negro, a trib. of the Paraguay. A centre for live-stock raising. Pop. 35,340.

Bagshot, Walter (1826-77), journalist, economist, and political writer. He was the son of a banker at Langport, Somerset, took his degree at London Univ., and was called to the Bar in 1852, but gave up law for literature, while retaining for many years a close connection with banking, which gave practical value to his economic studies. In 1858 he married Miss Wilson, daughter of the first editor of the *Economist*. Being in touch with many leaders in political and commercial life, including Gladstone, Sir George Cornewall Lewis, Robert Lowe, and prominent city bankers and merchants, he was able to write on politics and finance as one acquainted with their innermost working. His books, *The English Constitution* and *Lombard Street*, show not only observation, but deep research into the principles of gov. and finance. The theory of a practical banking reserve is developed by him with great clearness. His *Physics and Politics*, pub. in 1869, was successful abroad as well as at home. He was for many years editor of the *Economist*, and also helped to edit the *National Review*. He pub. his *Postulates of Political Economy* in 1876. His *Literary Studies and Economic Studies* were pub. after his death. See lives by Mrs Russell Barrington, 1914, and Wm Irvine, 1939.

Bagenaltown, see MUINE BHEAG.

Bagford, John (1650-1716), collector of rare books, both on his own account and on commission for booksellers and amateurs. He was b. in St Anne's par., Blackfriars, and began life as a shoemaker. He formed 2 collections, known as the Bagford Ballads, in which many old Eng. ditties have been rescued from oblivion, and the Bagford Fragments, an 'enormous collection of title-pages and other fragments in 64 vols. folio,' which earned him the description of 'shoemaker and biblioclast.' Apparently they were intended as materials for a hist. of printing. They

came to the Brit. Museum among the Harleian MSS. The Bagford Ballads were pub. in 1878 (ed. by Ebbsworth). B. was one of the revivers of the Society of Antiquaries. See Arundell Esdaile, *The British Museum Library*, 1946.

Baggaras, Muslim race of Bedouins, closely related to the Shuwa, who live in the valley of the Nile. Their chief occupation is cattle-rearing.



Paul Popper

BAGGARA

Baggesen, Jens Immanuel (1764-1826), Dan. poet, b. Korsør, d. Hamburg. While a student at Copenhagen he pub. his first work in verse, *Koniske Fortællinger*, 1785. In 1811 he was appointed prof. of Dan. language and literature at Kiel, but after 3 years returned to Copenhagen. He quarrelled with the romantic poet Øhlenschläger, and in 1820 left Denmark for good. He wrote much in German as well as in Danish. His works include the travel book *Labyrinthen*, 1792, and *Parthenis oder die Alpenreise*, an epic idyll, 1804. B. excelled in serio-comic satire. His *Samlede Vaerker* were pub. in 12 vols., 1827-32. See A. Baggesen, *Baggesen Biografi* (4 vols.), 1843-56, and C. E. Hesse, *Baggesen und die deutsche Philosphie*, 1914.

Baghdad, see BAGDAD.

Bagheria, tn in Sicily (q.v.), 8 m. ESE. of Palermo (q.v.). It has many fine 17th and 18th-cent. villas. Pop. 30,400.

Bagimond's Roll, originally named from Bolamund or Bagimond of Vici, or Vitia, who was sent by Pope Gregory X to assess the church revenues of Scotland for the purpose of raising a crusading fund, AD 1274. Part of this return has been preserved, and is known as B. R.

Bagirmi, or **Baghermi**, Moslem kingdom of W. Africa, lying SE. of Lake Chad. It is a Fr. possession. The people are of negroid race and number about 150,000. The cap. is Massenia.

Bagnacavallo (ancient Tiberiacum), It. tn, in Emilia-Romagna (q.v.), 11 m. W. of Ravenna (q.v.). Pop. 15,000.

Bagnacavallo, Bartolommeo (1484-1542), or **Ramenghi**, It. painter, b. Bagnacavallo. He studied under Francia, then worked for Raphael in Rome. He subsequently became eminent at Bologna, and was admired by Guido Reni and the Carracci, though Vasari (see *Lives of the Painters*) is severely critical of him. His prin. work at Bologna, 'The Disputation of St Augustine', was avowedly founded on Raphael's 'School of Athens.'

Bagnalstown, see MUINE BHEAG.

Bagnères-de-Bigorre (Rom. **Vicus Aquensis** or **Aquae Bigerrorum**), Fr. spa, cap. of an arron., in the dept of Hautes-Pyrénées, on the Adour. It has marble and slate quarries, textile manufs., and is a winter sports centre. Pop. 9900.

Bagnères-de-Luchon (Rom. **Balneariae Lixovienses**), Fr. spa in the dept of Haute-Garonne. It is a fashionable resort, and a centre for winter sports. Pop. 4100.

Bagnes (It. *bagno*), name given to the Fr. convict prisons which were substituted for the galleys in 1748. As the latter had naturally been stationed at the naval ports and arsenals, the B. were estab. in the same localities, and remained until the middle of the 19th cent. About 1852 the last 3, at Brost, Rochefort, and Toulon, were closed, and convicts were deported to Cayenne. The miseries of prisoners in the B., like those of galley-slaves, were extreme, and have often been described by writers of fiction. Jean Valjean, in Hugo's *Les Misérables*, was a sufferer there.

Bagnes, Val de, valley in the W. of Switzerland, canton of Valais. Its lower end opens into the valley of the Rhône, near Martigny. A catastrophe occurred here in 1818: the R. Dranse was for 2 months blocked by falls from the Grotto glacier; when the ice-dam burst the valley was devastated by a flood 90 ft deep.

Bagni di Lucca, It. spa, in Tuscany (q.v.), about 12 m. NE. of Lucca (q.v.). It is made up of sev. vills. in the Lima valley, and its hot mineral springs (temp. 98°-130° F.) have been known since early times; they were made popular by Falloppio (q.v.) in the 16th cent. Pop. 14,000.

Bagni di San Giuliano, see SAN GIULIANO TERME.

Bagno a Ripoli, It. tn, in Tuscany (q.v.). It is a SE. suburb of Florence (q.v.), and has warm baths. Pop. 19,000.

Bagno di Romagna, It. tn, in Emilia-Romagna (q.v.), 19 m. S. of Forlì (q.v.). It is in the Savio valley, near the source of the riv., and has hot springs. Pop. 10,600.

Bagnold, Enid, Brit. novelist, educ. at Godalming and in Paris. In the First World War she served as a V.A.D. and later with the F.A.N.Y. attached to the Fr. Army. Her war experiences are told of in *A Diary Without Dates*, 1917, and *The Happy Foreigner*, 1920. In 1925 she pub. *Serena Blandish*, and in 1935 her best-known novel, *National Velvet*, the story of a racehorse. *Sailing Ships*, 1918, is a vol. of poems. In 1920 she married Sir Roderick Jones, the prin. proprietor

of Reuters. Her play, *The Chalk Garden*, proved a great success when produced in London in 1956, and also on Broadway.

Bagnoles-de-l'Orne, Fr. spa in the dept of Orne. It is in the valley of the Vée on a lake. Pop. 730.

Bagnolet, E. suburb of Paris, known for its 'Plaster of Paris' (q.v.) made from local gypsum. It has textile and other manufs. Pop. 25,000.

Bagnols(-les-Bains), Fr. vil. in the dept of Lozère, on the Lot. It has sulphur springs. Pop. 320.

Bagnols-sur-Cèze, Fr. tn in the dept of Gard. It is thought that there were baths here in Rom. times. Wines and silk are produced, and there are nurseries. Pop. 5200.

Bagnone, It. tn, in Tuscany (q.v.), lying in the Magra valley, 17 m. NNW. of Carrara (q.v.). Pop. 1500.

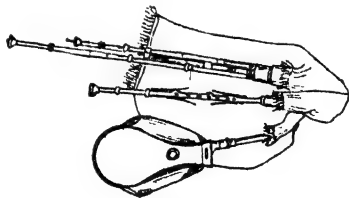
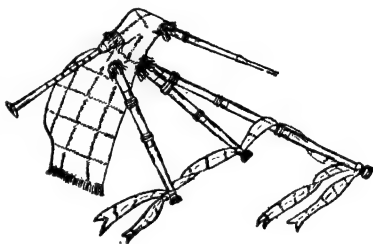
Bagos, name often given to eunuchs. The best known of these (called by Josephus, Bagoses) attained great power under Artaxerxes III, whom he poisoned. He also poisoned the son of Artaxerxes, who had succeeded him, and then tried to poison Darius III, but the king was warned, and made Bagoses drink the poison himself. See Josephus, *Ant.* xi. 7; Diodorus, xvi. 50, 51; xvii. 5.

Bagot, Sir Charles (1781-1843), Eng. diplomatist and thirty-fourth Governor-General of Canada. He negotiated the Rush-Bagot treaty (1817), which is still in force, between Great Britain and the U.S.A., limiting the armaments of each country on the Great Lakes. Was ambas. at St Petersburg in 1825 when the agreement with Russia was signed defining the NW. boundary of Brit. N. America. Though his tenure as Governor-General of Canada (1842-3) was brief, his administration prepared Canada for the self-gov. which she received not long afterwards from Lord Elgin (1847-54). This B. achieved by forming a dual administration of the two sections of the country, Upper and Lower Canada, a div. which was retained until the Confederation (1867). It was on B.'s initiative that the geographical survey of Canada was begun in 1843. He d. at Kingston, Ontario.

Bagpipe, musical instrument, being a development from the primitive reed-pipe. Its characteristics are the bag for the wind-supply and the peculiar 'drone' which furnishes the ground bass. The former may be inflated either by a blow-pipe, as in the Highland B., or by a bellows worked by the arm, as in the musette (French) and the Northumbrian pipes. Every instrument has these prin. parts: (1) the wind-bag; (2) the chanter, or melody-pipe, which always has a double reed, and lateral holes for fingering; (3) the drones, each of which has one invariable sound, but can be tuned by means of sliding joints. The compass of the chanter ranges from 9 notes in the Highland pipes to 12 in the Irish and 15 in the Northumbrian. The musette, as improved by Hotteterre in the 17th cent., had a wider range, and was popular in France, being played at court and in the opera; Lully wrote music for it. In a

Highland pipe the notes of the chanter do not correspond with those of the diatonic scale, and are not strictly in tune. The same note cannot easily be repeated without the interpolation of grace notes, known as warblers; these, introduced to overcome a difficulty, form one of the chief beauties in pipe-music, 'brilliance in his warblers' being one of the distinguishing marks of a skilful player.

'The key of the Highland pipe is that of A major with a natural G and with the C and the F something between the sharp and the natural—a unique scale, but one with some similarities to certain scales of the Near East' (Scholes). (The normal key of the Northumbrian pipe is G and it has usually 4 drones tuned to G and D.) The B. is suitable both for solemn funeral marches and laments and for the liveliest dances. As for its antiquity, a drone-pipe with reed complete has been found in an Egyptian mummy-case. The Romans had pipes and introduced them into S. Britain, whence they spread into Caledonia and Ireland, and survived there after they died out in England S. of Northumberland. They are mentioned in Ireland as early as (possibly) the 5th cent. The modern Irish 'union-pipe,' like the musette, is blown by bellows worked by the arm. The old Ger. *Dudelsack* was made in sev. forms varying in their range: one is said to have had separate chanters, on which a two-part melody could be played. See also Pibroch.



BAGPIPES

Above, Scottish. Below, Northumbrian.

Bagradas, anct name of the Medjerdah or Mejrda, African riv., which rises in the Great Atlas and flows in a NE. direction into the Gulf of Tunis. Its length is nearly 300 m.

Bagratidae, royal dynasty in Armenia and Georgia. They ruled in Armenia, 885-1045, then in Georgia until its annexation by Russia in 1800.

Bagration, Peter Ivanovitch, Prince (1765-1812), Russian general, descended from the Georgian branch of the Bagratidae. In 1805, covering the retreat of Kutusov's army before superior numbers under Murat, he showed skill and courage, losing half his men, but saving the main army. He served in sev. lost battles, Austerlitz, 1805, Eylau, and Friedland, 1807, but always won personal distinction. When Napoleon invaded Russia in 1812 B. commanded the 2nd Russian Army. As before he was unsuccessful, being beaten by Davout at Moghilev, 23 July, but succeeded in rejoining the main force under Barclay. On 7 Sept. he was mortally wounded at Borodino.

Bagshot Sand, or Beds, part of the Upper Eocene strata found round London, especially in Surrey, and stretching as far S. as the Isle of Wight. The heaths of Surrey and Hants belong to this formation.

Bagster, Samuel (1772-1851), publisher. He began as a bookseller in the Strand in 1794, and in 1816 removed to Paternoster Row. The firm which he founded is famous for its eds. of polyglot Bibles, including the *Biblia Sacra Polyglotta Bagsteriana*, 1817-28, for an octoglot ed. of the Church of England liturgy, 1821, and for *The English Hexapla*, 1827.

Bagulo, summer cap. of the Philippine Is., and cap. of Benguet prov. It is picturesquely situated in the mt dist., Luzon, a dist. which includes what were formerly known as the B. and Suyoc mineral dists. The tn is built at a high elevation and in the vicinity of splendid pine-woods. It suffered great damage in the Second World War. Pop. 29,262.

Bahá'í, believer in a religion founded in the Middle E. during the 19th cent. The Bahá'í Faith claims that it incorporates what is best in all religions. Twenty thousand martyrs have given their lives rather than deny it. It has 3 central figures. The forerunner was Ali Mohammed, born at Shiráz in 1819, who adopted the title *El Báb*, meaning the Gate, when he declared in 1844 that he was the 'Mihdí' or 'Qá'im' promised in the Qur'án to save the nations. Orthodox Muslims and the Persian State conspired to overthrow him, so that he spent most of his teaching life in prison, his followers zealously carrying on his work of proselytizing in the face of fierce persecution. He was finally shot publicly at Tabriz in 1850. The body was recovered by his followers and hidden for 50 years in various places, eventually being enshrined on Mt Carmel, the chief centre of Bahá'í pilgrimage. In 1863 Husayn 'Ali, a Persian nobleman who took the name Bahá'u'lláh, meaning 'The Glory of God,' announced himself to be the One foretold not only by the Báb, but in the holy books of all religions, who will inaugurate an era of peace and spiritual well-being for mankind. As a

Báb, he had already been deprived of his considerable possessions and banished to Bagdad; banishment to Constantinople, Adrianople, and the prison city of Acre followed. His writings include Kitáb-i-Aqdas, Kitáb-i-Iqan, and many letters, including proclamation of his claim to the chief sovereignty of the world, among them Queen Victoria. On his death in 1892, leadership passed to his eldest son, 'Abdu'l-Bahá, the exemplar of the Bahá'í Faith, who had shared his father's imprisonment since childhood. He was freed by the Turkish revolution of 1908 and made an extended tour of Europe and America in 1911-13. He was knighted in 1920 for the part he played in averting famine in Haifa during the war, and d. in 1921. His will appointed as guardian of the cause his grandson Shoghi Effendi (q.v.), then studying at Balliol College, Oxford, under whose guidance the administrative order of the Bahá'í Faith developed. The Bahá'í Faith is based on a belief in successive progressive revelations of God, none of which is final. Thus Mohammed was a great prophet and his doctrines were revealed, but neither his revelation nor that of Bahá'u'lláh precludes God from revealing himself further in future ages. The morality of the Bahá'í Faith is high. The individual soul continues to exist after separation from the body and may draw ever nearer to God throughout eternity. The Bahá'í Faith claims to restore to mankind the power to achieve unity through love. The troubles of the present age are but a prelude to the necessary and inevitable unification of the human race. All prejudice, particularly of race, colour, class, or creed, is condemned; compulsory education, abolition of extremes of poverty and wealth, equal status for men and women are among its social teachings. It prohibits slavery, asceticism, mendicancy, and monasticism, prescribes monogamy, discourages, but does not prohibit, divorce. A universal auxiliary language is advocated and collective security urged as a step towards a world commonwealth. The Bahá'í Faith now has several hundred thousand adherents drawn from every important religion in every country outside the Soviet orbit.

Bahamas, formerly *Lucayos*, archipelago of is., cays, and rocks, lying between 20° 50' and 27° 37' N. lat. and 72° 37' and 80° 32' W. long., and extending from Inagua on the S. to Matanilla Reef on the N., from Mayaguana and its rocks and cays on the E. to (and including) the Cay Sal Bank on the W. The B. are separated from Florida to the W. by the Straits of Florida, and from Cuba to the S. by the Old Bahama and Nicholas Channels. The B. comprise nearly 700 is. and more than 2000 cays and rocks. The aggregate land surface of the group is 4375 sq. m., which is slightly less than that of Jamaica, the largest of the Brit. W. Indian Is. The most important is., though not one of the larger is., is New Providence, which contains the cap., Nassau (q.v.), the chief port, inhabited by more than one-quarter of the total pop. of the Colony. The is.

is about 21 m. long from E. to W. and 7 m. in breadth from N. to S.

Climate. The winter climate of the B. is most delightful. Frost is unknown, the average temp. is about 70° F., the rainfall is slight and cool breezes prevail. The rainy months are May, June, Sept., and Oct. Rainfall is about 40 in. per annum. The greatest heat is experienced during July, Aug., and Sept., the temp. ranging from 80° to 90° F.

History. The B. were visited by Columbus in 1492, and he stated that the group of is. was called Lucayos, implying that the name was Indian or Arawak. While it has never been finally settled whether Watling Is. was his first landfall in Amer. waters, most authorities are agreed that it was on this is.—which Columbus named San Salvador and the Indians Guanahani—that he landed. Others think the honour belongs to Cat Is., and yet others say Great Turk Is. But Watling Is. won the official sanction of the Bahamian Legislature in 1926. A few years after Columbus landed, all the Carib inhab. were transported to work in the mines of Cuba. It does not appear that the Spaniards had any settlements on any of the is. at any time. Early in the 17th cent. the is. were well known to the settlers in Bermuda. They were included in the royal grant to Sir Robert Heath, the attorney-general of England, of 30 Oct. 1629. The Co. of Eleutherian Adventurers was formed in London under the aegis of Wm Sayle, a former Governor of Bermuda, for the purpose of making a systematic colonisation of the is., but Charles II, ignoring previous titles, granted the land, in 1670, to 6 of the lords proprietors of Carolina. Before this grant, however, the inhab. had organised a settlement and instituted a form of gov. which included an elective House of Assembly, and had selected Capt. John Wentworth as their governor (1671). He was confirmed in office by the lords proprietors. Thirteen proprietary governors were appointed between 1671 and 1715. The settlement on New Providence was sacked by the Spaniards on sev. occasions between 1680 and 1684. In 1684 most of the inhab. were driven away, and it was not until 1688 that the settlement was re-formed under Thomas Bridges with settlers from Jamaica. Bridges became governor, and the settlement developed promisingly until, in 1703, it was practically annihilated by the French and Spaniards. A year or two later, however, the dispersed inhab. returned to New Providence, and another proprietary governor was appointed in 1707. But the is. then became a regular resort of pirates, and this determined the Crown to place it under a civil and military gov. Since 1717 there has been a regular succession of royal governors. The is. were surrendered to a fleet of the Amer. rebels in 1776, and again to the Spaniards in 1781, but they had been retaken by the British before the end of the war, and the Peace of Versailles (1783) confirmed the British in possession. In 1787 the lords proprietors surrendered

all their proprietary rights to the king for £12,000, which was provided by Parliament. During the Amer. Civil War Nassau became the H.Q. of the blockade runners and enjoyed a rapid prosperity, the total value of trade, which was under £500,000 in value in 1860, rising to £10,000,000 in the 4 years 1860-4. A rather similar state of affairs prevailed 60 years later when the B. carried on a roaring trade during the period of prohibition in U.S.A. That the revenue of the B. was converted in 1920 from a threatened deficit to a surplus was entirely due to wine and spirit duties.

Occupations. The total of arable land at present cultivated in the B. is estimated at 30,300 ac. The total area of forest land is approximately 800,000 ac. Agric. production is mainly in the hands of individuals, but there are a few holdings on plantation scale. The prin. crops for local consumption and export are seasonal vegetables such as cabbages, beets, carrots, spinach, peas, beans. Onions, tomatoes, pineapples, citrus fruits, and bananas are grown but not as yet in sufficient quantities for export. Crawfish valued at £160,847 (13,536 cwt.) were exported in 1955, mainly to the U.S. Sponge fishing is not now of importance. In 1955 there were 3640 horses; 3480 horned cattle; 22,280 sheep; 14,250 goats; 10,360 pigs; and 506,500 head of poultry.

Two petroleum companies hold oil exploration licences granted by the Petroleum Board. No field work was done by the companies during the year 1955, but interest has revived. Timber is an important industry. The yellow pine (*Pinus caribea*) is commercially exploited. Of 650,000 ac. of pine forest owned by the Crown, 390,000 ac. are exploitable; the balance is inaccessible. A further 50,000 ac. which are freehold are 75 per cent exploitable. Of 100,000 ac. of broadleaf forest an estimated 70 per cent is exploitable. In 1955, 9,831,704 board ft of yellow pine were exported from Grand B.; 5,343,708 board ft from Andros. A further 10,735 cub. fathoms of pit-props were also exported. Exports in 1955 were 11,617 cub. fathoms of pit-props valued at £186,962 and 7,045,000 ft of pine valued at £264,795.

The tourist industry is the most important source of revenue to the B. and is increasing in volume. Arrivals in 1953 were 99,867, as against 118,481 in 1954, and 142,689 in 1955. Most of this trade originates in the U.S. and Canada. A great deal is being done to improve and extend the existing facilities for tourists. In 1955 new hotels were being built and a yacht harbour had been approved by the Legislature in the S. part of New Providence where a large area is to be systematically developed (capital is being provided from U.S. sources). In the industrial field the development of a free port in the is. of Grand B. may offer great opportunities for employment. Financed by U.S. capital, the scheme envisages the construction of a deep-water harbour at Hawksbill Creek, Grand B. The Free Port Authority has acquired 50,000 ac.

for development and zoned areas have been demarcated and a town-planning scheme approved.

Education. Primary education is free for persons unable to pay. The statutory leaving age is 14 and in 1955 the Board of Education spent £295,394 on primary education. There are 105 board schools, with a roll of 16,258 children in 1955. Another 3962 children attended 80 private and denominational schools. The gov. high school (1955) had a roll of 209 and 5 private and denominational schools 607. In 1950 a teachers' training college was estab.

Health. Malaria is unknown and the health services are of a high standard. Birth-rate per 1000 (1955) was 34.8; death-rate per 1000, 11.3; infant mortality rate (death under 1 year) per 1000 live births, 82.0.

Imports and Exports

Imports (total):		
1953	1954	1955
£8,797,396	£9,404,103	£10,859,926
Exports (total):		
1953	1954	1955
£1,045,260	£956,902	£757,253

Food-stuffs, beverages, apparel, boots and shoes, motor-cars and trucks, petrol and oil, and cement were the main items of imports by volume and value. The chief exports by value were lumber and pit-props, crawfish, salt, and tomatoes. Imports from the U.K. (1955) totalled £2,390,876, the next most important supplier being Canada, £869,084, followed by Aruba, £555,639. Exports were mainly to neighbouring is. and to the U.S., £245,399, and U.K. £174,926 (1955).

Administration. The gov. is modelled on that of England, the governor representing the Sovereign and the nominated Legislative Council and the elected House of Assembly representing respectively the House of Lords and the House of Commons. The 'Eleutherian Adventurers,' who came to the B. from Bermuda after the Parl. grant of 1647, brought with them a conception of representative gov. already estab. in Bermuda. A charter of 1670 to the Lords Proprietors provided for an elected House of Assembly, and the constitution, such as it exists to-day, was finally settled in 1729 when the Crown assumed direct control of the Colony. The present gov. is representative, though not responsible. The executive gov. is vested in the governor who is appointed by the Crown, and he has the right of veto, but by convention acts on the advice of the Executive Council. The Legislative Council consists of 9 members nominated by the Crown, and was created a separate council by Royal Letters Patent in 1841. The House of Assembly is composed of 29 members elected for 15 dists. Women are not enfranchised. No forms of local gov. exist.

Justice. The law of the Colony is the common law of England as it existed at the time of the settlement of the Colony subject to the exceptions mentioned in the Declaratory Act (Chap. 7 Statutes,

revised ed., 1929); Statutes of the Imperial Parliament; Statutes of the Colonial Legislature. The Supreme Court sits in Nassau, having the jurisdiction of a High Court of England, and is presided over by the Chief Justice. Appeal in civil matters lies from the Supreme Court to the Privy Council.

Currency and Banking. Brit. sterling is the official currency but silver coins used in the U.K. are legal tender only up to 40s. There are local notes of 4s., 10s., £1, and £5 denominations. U.S. and Canadian currency is freely in circulation but residents must surrender this currency to authorised dealers. There are 2 overseas banks in Nassau, one British and one Canadian. The totals of revenue and expenditure during the years 1955-5 were:

	Revenue	Expenditure
1953	£2,610,678	£2,712,272
1954	£3,095,541	£3,006,515
1955	£3,507,953	£3,188,617

The main source of revenue from taxation was customs receipts, which were £2,024,502 in 1955.

Communications. The B. are in direct steamship communication with the U.K., Canada, the U.S.A., the W. Indies, S. America, and New Zealand. There are no railways in the Colony. All main roads and most of the secondary roads in New Providence are asphalted. Of the 205 m. in the Colony, 112 m. are asphalted. Oakes Airport in Nassau is an international airfield from which sev. international airlines operate.

Population. The estimated pop. in Dec. 1955 was 98,500, made up approximately of European, 10,800; African, 72,000; mixed, 12,500; others, 3200. See *Colonial Office Annual Reports*, and T. A. Thompson, *A Short Geography of the Bahamas*, Nassau, 1944.

Bahawalpur, tn, and former State, of W. Pakistan, lying on the railway between Karachi and Lahore. B. is a centre of new and expanding industry; cotton factories are being built and Lever Bros have installed a soap factory.

Bahia, see BAHIA.

Bahia Blanca, rail centre, 3 m. up the R. Napostá, prov. of Buenos Aires, Argentina, 350 m. from cap. Its port on Bahia Bay has been handicapped by a shallow channel, but dredging operations are expected to maintain a minimum draught of 30 ft. B. B. was founded in 1828; its prosperity dates from 1885, when the first railway was opened. It exports wheat, wool, meat, and hides. The naval station of Puerto Militar lies below the city. Pop. 93,122. See A. H. Coleman, *Mi vida de ferroviario inglés en la Argentina 1887-1948*, 1949.

Bahia de Todos los Santos, see ALL SAINTS' BAY.

Bahinda Steppe, see BAYIDA.

Bahr, Arabic term meaning sea, or large riv., as B.-el-Abiad and B.-el-Azrek, the White and Blue Nile. A dry riv.-bed is sometimes called B.

Bahr, Hermann (1863-1934), Austrian novelist, critic, and dramatist, b. Linz,

He is remarkable for his versatility. He wrote on naturalism in 1891 and on expressionism in 1914, passing through impressionism and symbolism. His best plays include *Der Meister*, 1903, and *Das Konzert*, 1909; his novels *Die Rahl*, 1908, and *Himmelfahrt*, 1916. He was also for a time manager of Reinhardt's Deutsches Theater and of the Vienna Burg Theater. See W. Handl, *Hermann Bahr*, 1913.

Bahram, or Vahram, name of 5 Persian monarchs of the Sasanid dynasty. They were B. I (AD 273-6), during whose reign the execution of Mani, founder of the Manichaeans (q.v.), took place; B. II (276-93), son of the foregoing; and B. III (293), son of B. II, who reigned for only a few months. War with Rome broke out under B. II and was concluded by the peace of 283, by which Armenia and Mesopotamia went to Rome; B. IV (388-399), son of Shapur III; and B. V (420-438 or 439), son of Yazdgerd I. B. V was a notorious persecutor of the Christians, a policy which involved him in war with Rome; by the treaty of peace concluded in 422, mutual toleration was extended to both Christians and Zoroastrians.

Bahramabad, see KAFSENJAN.

Bahr-bela-Ma (the waterless sea), valley in the Libyan desert, 50 m. W. of Cairo. It is 9 m. long, very deep, and dry and barren, but has been a watercourse. Some assert, on the strength of a passage in Herodotus, that a branch of the Nile once flowed here.

Bahrain, independent Arab state under Brit. protection. The ruling family came from near Koweit in 1782 and took B. from the Persians; hence the frequent claims of Persia to the is. It was in treaty relations with the Gov. of India for over a cent. It is a group of is. half-way up the Persian Gulf near the Arab coast (Al Hasa) and having a combined area of 213 sq. m. and a Muslim pop. of about 150,000. Manama, or B., the largest is. of the group, lies at the mouth of B. Bay; it is 27 m. long by 10 m. wide, flat on the whole, but having in its centre a rocky hill, Jebel Dukhan. The chief tn of B. is Manama (pop. 25,000). The next largest are Muharraq or Moharek, situated on a neighbouring smaller is., and Sitrah. The whole group is fertile, producing rice, herbs, and fruit; fish are abundant, and the pearl fisheries of B. have been famous for cents. The Bahrain (Brit.) Petroleum Co. have held a concession from the gov. since 1930 and have an oil refinery at Manama. The yield is over 1,000,000 tons (metric) a year. The ruler is a sheikh, to whom is attached a Brit. adviser and a Brit. political agent. On B. itself there is an immense collection of huge sepulchral tumuli, enclosing tombs of limestone; the plan of them is very like that of Phoenician tombs. Religion, Muslim. The pop. of the is., numbering altogether 120,000, are a mixed race, mainly Persian and Arab.

Bahrain Bay, on the E. coast of Arabia, noted for its pearl fisheries.

Bahr-el-Abiad, or White Nile, riv. in

Africa, rising in Lake Victoria, one of the chief branches of the main Nile R. It flows through about 2300 m. of flat marshy country, and is fed by the trib. rivs. Sobat on the E. and Bahr-el-Ghazal on the W. At Jinja the Owen Falls hydro-electric scheme was opened by Queen Elizabeth II in April 1954. Egypt's ability to maintain the mass of her people at subsistence level largely depends on the uninterrupted flow of the White Nile.

Bahr-el-Azrek, or Blue Nile, African riv. rising near Tana (or Tsana) in Ethiopia, at an elevation of 7000 ft. It unites with the White Nile, Bahr-el-Abiad, at Khartoum. Its length is about 900 m., 500 m. of which are navigable at high water. In Ethiopia it is called Abai. In ancient times the Blue Nile was temporarily diverted by the Ethiopians, thus causing great distress and alarm in Egypt, which derives the greater part of its vital Nile waters from the Blue Nile during part of the year. The Blue Nile is a weapon of immense strategic importance in the hands of Ethiopia and is the historical cause of Egyptian aspirations in respect of Ethiopia.

Bahr-el-Ghazal: 1. Trib. of the White Nile (or Bahr-el-Abiad), which it joins at Sobat. This riv. is responsible for the floating vegetation, called the *sudd* of the Nile. It gives its name to the dist. of Sudan through which it flows, formerly leased to the Congo Free State, but, since 1906, in the Brit. sphere of influence.

2. Riv. of the Sudan, which rises in the E. end of Lake Chad and flows in a N.E. direction, until it spreads into the lagoon of the Bodele.

Bai, Tommaso (1650-1714), It. tenor singer and composer, b. Crevalcore, near Bologna. He became master of the pontifical chapel. He is celebrated on account of his beautiful *Miserere*.

Baia (formerly *Bahia*), E. prov. of Brazil, state (since 1889) bounded on the N. by the states of Pernambuco and Piau, on the S. by Minas Geraes, on the W. by Goiás, and on the E. by the Atlantic Ocean. The land by the coast is fertile and woody, the climate being hot and moist. The interior is rocky, with plateaux rising in terraces, and the climate is dry. The country is watered by the R. São Francisco and its tribs. The prin. products of the soil are sugar, tobacco, coffee, cotton, Indian corn, rice, and cocoa. The SE. produces 95 per cent of Brazil's cacao crop. B. is a leading cattle-, sheep-, and hog-raising state, and yields most of Brazil's black industrial diamonds. Area 217,688 sq. m.; pop. (1950) 4,900,419.

Baia (Bahia), cap. of the state of B.; see of an archbishop, and a univ. tn, fourth largest city of Brazil. It is a hot, unhealthy port lying 750 m. to the N. of Rio, and is the oldest tn in Brazil. The upper and lower portions are connected by a celebrated lift system. As well as the univ. there are colonial and modern gov. buildings, a cathedral, and a monastery, Asã Bento; a normal school, a museum, and a public library. Seaport, with a flourishing shipping trade. There

is a fine harbour, protected by the natural breakwater formed between the is. Itarparica and the mainland. Industries are sugar refining, distilling, cotton-milling, cacao-processing, fruit-preserving, ship-building, boots and shoes, hats, and cotton materials, which are exported with agric. produce, hides, and jute-wares. The city was visited by Amerigo Vespucci, 1503, and again by Correa, a Portuguese, in 1510. It was colonised in 1536, but abandoned and refounded, 1549. Until 1763 it was the seat of the viceroys of Brazil, and it is one of the intellectual and economic centres of the country. Pop. (1950) 395,993.

Baiae, modern **Baia**, It. tn, in Campania (q.v.), on the Bay of Naples (q.v.), 10 m. W. of Naples. In Rom. times it was a watering-place, with warm sulphur springs; it had baths and palatial residences, and was a favourite resort of the Caesars. Nero built a villa here, and Hadrian d. in one that had belonged to Julius Caesar. B. had from early times a reputation for immorality; Cicero once apologised for defending a man who had lived there. The most notable relics of antiquity are the temples of Venus, Mercury, and Diana.

Baie des Chaleurs, see CHALEURS BAY. **Baiersbronn**, Ger. tn in the Land of Baden-Württemberg (q.v.), on the Murg, 42 m. SW. of Stuttgart (q.v.). It is a winter and health resort in the Black Forest (q.v.). Pop. 8100.

Baif (or **Bayl**), **Jean Antoine de** (1532-1592), Fr. poet, b. Venice. He studied with Ronsard under Daurat. He was a member of the Pléiade, and attempted to write Fr. verses with cadence and accent of Gk and Lat. poetry. These verses he set to music, and in 1561 pub. *Twelve Hymns or Spiritual Songs*, and in 1578 sev. books of songs. He founded an 'Académie de poésie et de musique,' 1567-84, in Paris, which was the first of its kind. His poems were pub. in 2 vols., *Oeuvres en rime* and *Les Jeux*, in 1573, and consist of serious, comic, and sacred pieces. His *Poésies choisies* have been ed. by Becq de Fouquières, 1874, and his *Mimes, enseignements et proverbes* by Blanchemain, 1880. See M. Augé-Chiquet, *La Vie, les idées et l'œuvre de Jean Antoine de Baif* (Paris), 1909.

Baikal, see BAYKAL.

Baikie, **William Balfour** (1824-64), explorer and naturalist, b. Kirkwall, Orkney. Obtaining his M.D. degree at Edinburgh in 1848, he became a surgeon in the R.N., and in 1854 was appointed surgeon and naturalist to the *Pleid* expedition, sent to explore the Niger. The chief officer dying, B. took command, and succeeded in going 250 m. further than any previous explorer, without losing another man. In 1857 he again went out in the *Pleid*; the ship was wrecked up the Niger, and his party returned home, but he remained in the country, and single-handed laid the foundation of the present colony of Nigeria. He d. at Sierra Leone.

Bail. In law, when a person is charged with an offence he may be released on

security given by one or more persons, usually householders, that he will appear at the trial. He is then on B., or in the B., i.e. custody, of the person giving B. or security. If he fails to appear, the B. is forfeited. If the sureties think the bailed person will not appear, they may surrender him, and be relieved of liability. A justice may now dispense with sureties and release the accused on his own recognisances if he be of opinion that justice will not be defeated. In felonies other than treason and in certain misdemeanours, the magistrate may in his discretion admit to B., but is not obliged to do so. In all other misdemeanours and in all summary cases the magistrate is bound to admit to B. In practice, however, B. is never allowed in a charge of murder, or in misdemeanours where the costs of prosecution may be allowed out of the co. rate. In treason it can only be granted by a judge of the Queen's bench div. or a secretary of state. The police may grant B. if, on arrest without warrant, the prisoner cannot be tried within 24 hours. In Scotland (Bail Act, 1888) murder and treason are the only non-bailable offences. The high court and the lord advocate can admit to B. In U.S. law B. is used to indicate either the bond which is furnished or the persons who bind themselves under penalty to see that the accused appears. Some state constitutions contain specific provisions as to the cases in which B. may be allowed; in other cases the courts have a general discretion, subject to statutory regulations. Release on B. is the rule, except in cases of murder or other capital charges. The amount of B. or penalty in the bond is fixed by the judge or court. The prohibition in the U.S. constitution of excessive B. is interpreted as a direction that B. shall not be refused in a proper case. See CRIMINAL LAW.

Baldon, tn in the W. Riding of Yorks, England, 4 m. N. of Bradford. There are sev. industries, including worsted mills and chemical works. Pop. 10,132.

Bailén, or **Baylén**, Sp. tn in the prov. of Jaén. Here, in 1808, the French suffered their first serious reverse in the Peninsular war, at the hands of the Spaniards. Pop. 10,300.

Bailey, prison or any modern structure situated where courts existed, as the Old B. in London. It formerly meant the exports of a castle formed by the spaces between the outward wall and the keep. In olden times it also meant the work, fenced with palisades or masonry, covering the outskirts of a tn by way of defence.

Bailey, **Henry Christopher** (1878-), novelist, b. London. He was educ. at the City of London School and Oxford, where he wrote an historical novel, *My Lady of Orange*. From 1901 to 1946 he was on the staff of the *Daily Telegraph*. He wrote a large number of novels, but is best remembered for his detective stories, *Call Mr Fortune*, 1920, *Mr Fortune's Practice*, 1922, and other books relating the adventures of that popular investigator.

Bailey, **Liberty Hyde** (1858-1953),

Amer. botanist and lecturer, b. S. Haven, Michigan; educ. at Michigan Agric. College and Wisconsin Univ.; prof. of agriculture at Michigan Agric. College 1885-8; later prof. of horticulture, Cornell Univ., fellow of the Amer. Academy of Arts and Sciences and the Botanic Society of America, and president of both in 1926. Among his works are *The Survival of the Unlike*, 1896, *The Cyclopaedia of American Horticulture*, 1900-2, *Botany*, 1901, *Lessons with Plants*, 1904, *The State and the Farmer*, 1908, and *The Apple Tree*, 1922.

Bailey, Nathan, or Nathaniel (d. 1742), lexicographer and philologist. His *An Universal Etymological English Dictionary*, pub. in 1721, an improvement on previous lexicons, went through many eds., and was taken by Dr Johnson as the basis of his dictionary 20 years later.

Bailey, Philip James (1816-1902), poet, b. and educ. at Nottingham. In 1835 he went to London, and entered Lincoln's Inn, but did not take up the legal profession in earnest. In 1839 he pub. his poem *Festus*, a version of the Faust legend. He continued to revise and enlarge it in successive eds. for the next 50 years. It is a work of great imaginative power and lofty moral tone, but has faults in execution. B.'s later poems, *The Angel World*, 1850, *The Mystic*, 1855, and *The Universal Hymn*, 1867, were, comparatively, failures.

Bailey, Samuel (1791-1870), philosophical writer, son of a Sheffield merchant. For some years he took an active share in business. His first book, *Essays on the Formation and Publication of Opinions*, appeared in 1821, and a sequel, *On the Pursuit of Truth*, in 1829. Other works were *A Theory of Reasoning*, 1851, and *Letters on the Philosophy of the Human Mind* (3 vols.), 1856-63.

Bailey, Old, see OLD BAILEY.

Bailey Bridge, see BRIDGING, MILITARY.

Baillie, or Baillie, superior officer or magistrate of a municipal corporation in Scotland. B.s are invested with certain judicial and administrative authority within the city or burgh for which B.s are appointed. They are assisted by a paid legal adviser called an assessor. The office is in some respects analogous to that of alderman in England, but unlike an Eng. alderman he retains his seat for the ward to which he has been appointed after selection as a B. The term of office is 3 years.

Bailiff, Eng. legal term signifying a superior steward or agent. The keeper of Dover Castle is called the Queen's B. The name now generally applies to the sheriff's officers. Such are either B.s of hundreds or special B.s. The former are appointed by the sheriff to collect fines, summon juries, execute writs and processes, and attend at assizes and quarter sessions. The latter were men selected for their skill in hunting and apprehending persons liable to arrest. Being compelled to enter into an obligation for the due performance of their duties, they are sometimes called bound-bailiffs, or vulgarly bum-bailiffs. Special B.s are appointed at the request

of a suitor, and the sheriff is not responsible for what is done by them. A B. cannot lawfully act until he has received a warrant under the hand and seal of the sheriff. B.s of a franchise or liberty are appointed by the lord of a liberty. They exercise jurisdiction in certain parts of the country, e.g. the liberty of Gower in Glos. The high B. of a co. court appoints sub-bailiffs who execute process of the court. His office is for life. See LOCAL GOVERNMENT.

Bailiwick, legal term used with regard to the co. or dist. over which the sheriff, as bailiff of the queen, has jurisdiction. See LOCAL GOVERNMENT.

Baillet, Adrien (1649-1706), Fr. critic, b. Neuville-au-Hez, in Picardy. He studied in a neighbouring convent, where he was introduced to the Bishop of Beauvais, who assisted him in obtaining a good education. In 1676 he received holy orders and was given the vicarage of Lardières; in 1680 he became librarian to M. de Lamoignon, the advocate-general. His *Les Enfants devenus célèbres par leurs études et par leurs écrits* (Paris, 2 vols., 1688) won popularity. His prin. work is *Jugements des savants sur les principaux ouvrages des auteurs*, 1685-6. He also wrote a life of Descartes (1691) and various historical works.

Bailleur, Fr. tn in the dept of Nord, on the R. Becque. The *hôtel de ville* dates from the 15th cent. The Bailioli family (q.v.) is said to have derived its name from B. The tn was largely destroyed in the First World War and afterwards rebuilt. The chief manufs. are linen and lace. Pop. 11,400.

Bailiage, Fr. term, equivalent to bailiwick. The word was used in Switzerland of portions of ter. over which a bailiff was appointed. This officer was in charge of the police and had jurisdiction in certain civil and criminal cases. In case of maladministration, appeal lay to the cantons to which the B. belonged.

Baillie, Lady Grizel (1665-1746), poetess, b. Kebrass Castle, Berwickshire, daughter of the patriot, Sir Patrick Hume, 1st Earl of Marchmont. In 1684 she supplied her father with food during his concealment in the vault of Polwarth church, and accompanied him when he fled abroad (1686-8). In 1692 she married the son of Robert B. of Jarviswood. The best known of her songs is 'And werena my heart licht I wad dee.' Memoirs of her and her husband were written by her daughter, Lady Grizel Murray of Stanhope (1693-1759).

Baillie, Joanna (1762-1851), poetess and dramatist, b. Bothwell, Lanarkshire. Educ. at Glasgow, she moved to London and spent her life there. Her *Plays on the Passions* (1798-1836) are artificial in conception and lacking in dramatic incident, but they are written with vigour, and were admired by Scott. *De Montfort* had a vogue through the acting of John Kemble and Mrs Siddons. She is at her best in her songs and ballads written in the Scottish dialect. See M. S. Carhart, *Life and Work of Joanna Baillie*, 1923.

Baillie, Matthew (1761-1823), anatomist

and physician, *b.* Shotts, Lanarkshire, nephew of John and William Hunter. Educ. at Glasgow and Oxford; M.B., 1786. Appointed physician to St George's Hospital, 1787; M.D., F.R.C.P., 1789. From 1810 he was physician to members of the Royal family. His *Morbid Anatomy of Some of the Most Important Parts of the Human Body* (1793; atlas, 1802) is one of the landmarks in the hist. of pathology and the first great work on the subject written in English. See life in T. J. Pettigrew's *Medical Portrait Gallery*, vol. ii, 1840.

Baillie, Robert (1599-1662), Scottish Presbyterian divine, educ. at Glasgow Univ. He was one of the commissioners appointed to prepare charges against Archbishop Laud, 1640 and became the first prof. of divinity at Glasgow Univ., 1642. He sat in the Westminster Assembly of Divines, and was made prin. of Glasgow Univ., 1660. B. had great influence on Scottish political affairs, playing a considerable part in rousing Scottish opposition to Charles I. and, later, in urging the repudiation of Cromwell and the restoration of Charles II.

Baillie, Robert, of Jerviswood (d. 1684), Scottish revolutionary, who has been called the Scottish Algernon Sidney. He opposed the tyranny of Charles II's favourite, the Duke of Lauderdale, in 1676, and was arrested on a charge of complicity in the Rye House plot, condemned to death, and hanged at Edinburgh.

Baillière, Jean-Baptiste Marie (1797-1882), founded the publishing firm of J. B. Baillière et Fils in Paris, and in 1826 started a branch in London to sell Fr. medical and technical books. He placed his brother Hippolyte in charge of the London house, which business was carried on successfully by H. B. until his death and afterwards by his widow. In 1869 A. A. Tindall and George Cox bought the business and continued it under the style of Baillière, Tindall & Cox, which to-day remains one of the best-known specialist medical publishing firms in London. The original Paris house is still active and also specialises in medical books. There is, however, now no connection between the Paris and London firms.

Baillon, Ernest Henri (1827-95), Fr. botanist, *b.* Calais. In 1864 he was appointed prof. of natural hist., and later prof. of hygiene, at the Industrial School of Art at Paris, where he *d.* Author of *Histoire des plantes*, 1860-85, and *Traité de botanique médicale phanérogamique*, 1884.

Ballot, Pierre (1771-1842), Fr. violinist. He studied music in Paris and Rome, made his début in Paris in 1791, and was prof. of the violin in the Paris Conservatoire from 1795 till his death. He studied the theory of music under Catel, Reicha, and Cherubini. He entered Napoleon's private orchestra in 1802, and afterwards travelled in Russia with Lamarre, 1805-8. In 1814 he organised concerts for chamber music in Paris with great success; toured in Holland, Belgium, and England, 1815-16, and became a

member of the London Philharmonic Society; director of the Paris Opera, 1821-31, and of the Royal Orchestra, 1825. B. belonged to the classical school of violin players, and won fame as a teacher. His compositions are difficult, and have been almost forgotten, but his *Art du Violin*, 1834, is still regarded as a standard work.

Baillou, Guillaume de (otherwise **Ballonius**) (1538-1616), Fr. physician, *b.* Paris. Began by teaching classics and philosophy in the univ. of Paris, and then studied medicine, taking his doctor's degree in 1570. B. was essentially the resuscitator of anct. medical studies, particularly the work of Hippocrates. He was the first modern epidemiologist and his outstanding work on this subject was his *Epidemiorum et ephemeridum libro duo* (Paris) (1640), which revived the doctrine of Hippocrates in 'epidemic constitutions.' He thus gave the impulse to Sydenham who went still further in the doctrine. Another notable work was *Definitionum medicinarum liber* (1639) (a glossary of the terms of Hippocrates). He is further remembered for being the first to differentiate between rheumatism and gout, and to describe arthritis, whooping cough, and sev. diseases of women (*De virginum et mulierum morbis liber*, 1643). His collected works were pub. in 4 vols., 1734-6.

Bailly (or Bailli), David (1584-1657), Dutch artist, *b.* Leyden. He studied first under his father, Peter B., and was afterwards a pupil of Jacob de Gheyn. He won a reputation as a portrait painter.

Bailly, Jacques (1629-82), Fr. painter, *b.* Gracay (Cher.). He settled in Paris and became a member of the Academy of Painting, in 1664. He etched 12 plates, representing bouquets of flowers, but is better known for his portraits in miniature.

Bailly, Jean Sylvain (1736-93), Fr. statesman and astronomer. In 1784 he was elected a member of the Fr. Academy and in 1785 of the Academy of Inscriptions. In 1789 he was president of the Third Estate and of the National Assembly and was mayor of Paris, 1789-91. He allowed the soldiers to fire on the mob in the Champs de Mars, July 1791, and immediately lost his popularity. He was executed in 1793 on a charge of conspiracy. His most famous pub. was his *Histoire de l'astronomie* (1775-87).

Bailment, term for the delivery of goods by the bailor to the recipient or bailee to be held according to the purpose of the delivery, and to be restored when the purpose is accomplished. B. is of 3 kinds: (1) For the benefit of the bailor or his representative. The bailee receives and keeps his deposit without reward, and is responsible only for gross neglect. (2) For the benefit of the bailee or his representative. The bailee receives a gratuitous loan, which he must return, without payment, at the end of a certain time. He is responsible in this case for the least neglect. (3) For the mutual benefit of the bailor and bailee or their respective representatives. This includes deposit as

a security (as when goods are left with a pawnbroker, or when furniture is stored with a warehouseman), and the hiring of the use of a bailed article. The bailee is responsible only for ordinary neglect.

Baily, Edward Hodges (1788-1867), Eng. sculptor, *b. Bristol*. He went to London in 1807 and entered Flaxman's studio. He was employed by George IV to execute the sculpture in front of Buckingham Palace and the figures on the Marble Arch. He executed a number of busts and statues of public men, the Nelson monument in Trafalgar Square, Charles James Fox and Lord Mansfield in St Stephen's Hall, Westminster, also the statue of Athens for the Athenaeum Club.

Baily, Francis (1774-1844), astronomer, *b. Newbury*. In 1827 he was awarded the gold medal of the Royal Astronomical Society (of which he was president at the time of his death) for revising their Star Catalogue. He set on foot the reform of the *Nautical Almanac*, 1829. See BAILY'S BEADS.

Baily's Beads, name given to a phenomenon which is observed in connection with the total eclipses of the sun, first fully described by Francis Baily (q.v.). Owing to the effect of irradiation and the irregularity of the moon's edge, the crescent-shaped portion of the sun that is unobscured by the moon's disk looks like a belt of bright spots in a dark background, compared to a string of beads.

Bain, Alexander (1818-1903), Scottish psychologist and philosopher. Educ. Marischal College, Aberdeen, 1836-40; became prof. of natural philosophy in the Andersonian Univ., Glasgow, 1845; secretary of the Board of Health, 1848-50. In 1860 he was appointed to the chair of logic in Aberdeen, and on his retirement was made lord rector of his own univ., 1881. He followed in the steps of Hartley, in that his psychology was based on physiology, and he belonged to the experimental as opposed to the transcendental school. His prin. works are *The Senses and the Intellect*, 1855, *The Emotions and the Will*, 1859, *Study of Character*, 1861, *Mental and Moral Science*, 1868, *Logic*, 1870, and *Relation of Mind and Body*, 1873. In addition he assisted in the editing of Grote's *Aristotle* and ed. Grote's *Minor Works*; he wrote, in 1882, a biography of James Mill, as well as a criticism of J. S. Mill. His autobiography appeared in 1904.

Bainbergs (sometimes called Schinbalds), armour (q.v.) of the 13th cent. to protect the legs.

Bainbridge, John (1582-1643), astronomer, *b. Ashby-de-la-Zouch*. He was the first Savilian prof. of astronomy at the univ. of Oxford. Pubs.: *An Astronomical Description of the late Comet*, 1619; *Procli Sphaera*, 1620; *Circularia*, 1648.

Bainbridge, William (1774-1833), Amer. naval officer, *b. Princeton, New Jersey*. He entered the merchant marine service at the age of 15; became a lieutenant-commandant in command of the schooner *Retaliation* in 1798; was captured off Guadeloupe by the French. In 1800 he was promoted to the rank of captain, and

was sent on an embassy to the Dey of Algiers, who pressed him into Algerian service, under which flag he was compelled to go to Constantinople. When in command of the *Philadelphia* he captured the Moorish frigate *Mesboha* (1803), but was himself taken prisoner off Tripoli. He was appointed commodore in 1812, in command of the *Constitution*, *Hornet*, and *Essex*, and captured the Brit. frigate *Java*. In 1820, on the *Columbus*, he went for the fifth time in his life to the Mediterranean, to impress the predatory nations with the growing power of the U.S.A. From 1832 to 1835 he acted on the board of naval commissioners.

Bainbridge, Sir Philip (1786-1862), Brit. general. He entered the Navy as a midshipman in 1799, but retired through ill health. In 1800 the Duke of York appointed him to an ensigncy in the 20th Regiment; inspector of fortifications at Curaçao, 1807; entered the senior dept of the Royal Military College at High Wycombe, 1809, where he invented a projecting pocket sextant; deputy assistant quartermaster-general in Portugal, 1811. He took part with distinction in the Peninsular war and also served in France. He commanded the forces in Ceylon, 1852-4, and was promoted to the rank of lieutenant-general.

Baines, Edward (1774-1848), journalist and economist, *b. Walton-le-Dale, Lancs*. He was apprenticed to a printer first at Preston and then at Leeds; bought the *Leeds Mercury* in 1801; and was M.P. for Leeds, 1834-41, as an independent Liberal. He advocated the reform of factory laws, Catholic emancipation, and opposed state interference in educational matters. He wrote a *History of the Reign of George III*, 1823, and a *History of the County Palatine and Duchy of Lancaster*, 1836. See life, 1851, by his son, Sir Edward B.

Baines, Peter Augustine (1786-1843), prelate, *b. Kirkby, Lancs*. He was educ. at the Eng. Benedictine abbey of Lampshire, Hanover, and entered the Benedictine order in 1804, and became a priest in 1810. He taught at Ampleforth till 1817, when he undertook the mission at Bath. He won a reputation as an eloquent preacher, and in 1823 he was appointed coadjutor-bishop to Collingridge, Vicar Apostolic of the W. District, and in the same year was consecrated Bishop of Siga. In 1829 he succeeded Collingridge, and in this year he bought Prior Park, where he founded St Peter's and St Paul's, a lay and eccles. college respectively. According to Wiseman, it was only the death of Leo XII which prevented B. from being created cardinal.

Baini, Giuseppe (1775-1844), It. priest, musical author, and composer, *b. and d. Rome*. He was appointed master of the pontifical chapel, composed numerous works, of which the chief is a *Miserere*, and wrote the *Memorie storico-critiche della vita e delle opere di Giovanni Pierluigi da Palestrina*, 1828.

Bains-d'Arles, see AMÉLIE-LES-BAINS.
Bains-les-Bains, Fr. spa in the dept of Vosges, 16 m. SSW. of Épinal. The

waters (86–123° F.) are used for rheumatic and arterial troubles. Embroidery is made. Pop. 1700.

Baiocco, or **Bajocco**, coin worth about a halfpenny, coined by the papal states, 1–100th part of the scudo = 4s. 3d., so called from its brown colour.

Bairaktar, or **Bairak-dar** (1755–1808), title of Mustapha, grand vizier of Mahmud II. He was b. of poor parents, and distinguished himself as a soldier, hence his title of B., meaning standard-bearer. On hearing that the janizaries had murdered Selim III and put Mustapha IV on the throne, he marched to Constantinople, deposed Mustapha, and elevated his brother Mahmud II to the throne, 1808. He was then appointed grand vizier. His policy was to strengthen the regular army and crush the power of the janizaries. But the janizaries revolted, seized the Seraglio, and demanded the restoration of Mustapha. B. then strangled Mustapha and killed himself.

Bairam, or **Beiram**, name in Turkey of 2 great Muslim festivals: (1) The Breaking of the Fast at the end of Ramadan; it lasts from 1 to 3 days and people put on new clothes and give presents. (2) The Festival of Sacrifices on the tenth day of the last month of the year. On that day the pilgrims kill their sacrifices (see HADJ) and those at home make their offering. Muslims explain this as a memorial of the sacrifice by Abraham.

Baird, Sir David (1757–1829), general, b. Newbyth, E. Lothian. Entered the service, 1772; served in Brit. India, 1780–9. He was wounded while fighting against Hyder Ali at Pernambucum in 1780, and was taken prisoner and kept in a dungeon at Seringapatam for nearly 4 years. He took Pondicherry 1793. In 1799 he led the assault at Seringapatam. Col. Wellesley (afterwards Duke of Wellington) being in command of the reserve. In 1801 he commanded an expedition to Egypt for the expulsion of the French. On his return to India he complained of the preference given to Wellesley, and asked for leave of absence. In 1804 he was knighted. Led an army to recapture the Cape of Good Hope from the Dutch settlers, 1806, and served at the siege of Copenhagen, 1807. In 1808 he was sent to the assistance of Sir John Moore with a reinforcement of 10,000 men, and distinguished himself at Corunna, 1809. In 1820 he was appointed Commander-in-Chief in Ireland, but was not successful as an administrator, and was removed from office in 1821, when the Marquess Wellesley became lieutenant.

Baird, Dorothea (Mrs H. B. Irving) (1873–1933), actress, b. Northumberland and educ. at a high school in Hampstead. She joined Bon Greet's company, filling Shakespearean roles. She made her name as the original Trilby in Sir Horbert Tree's production in 1895. Other parts: Sophia, in *Olivia*; Aote, in *Nero*; Mrs Darling, in *Peter Pan*; and Portia.

Baird, Henry Martyn (1832–1906), Amer. historian, b. Philadelphia, Pennsylvania; educ. Paris and Geneva, and

graduated at New York Univ., 1850. Was a tutor at Princeton Univ., and from 1859 to his death prof. of Greek at New York Univ. His best-known works are *History of the Rise of the Huguenots of France*, 1879, *The Huguenots and Henry of Navarre*, 1886, and *The Huguenots and the Revocation of the Edict of Nantes*, 1895.

Baird, Sir John, see STONEHAVEN.

Baird, John Logie (1883–1946), inventor of television, b. Helensburgh, Scotland, son of the minister of West Parish church; educ. at Larchfield and the Royal Technical College, Glasgow. He undertook independent research at the age of 18, when he set up a small laboratory at Hastings, and devoted himself to the problem of 'seeing by wireless.' By 1924 he had designed apparatus for image transmission in outline by wire or by wireless. Two years later television was demonstrated by B. at the Royal Institution. In 1928 B. demonstrated the possibilities of transatlantic television. In 1929 the Ger. post office, and later the Brit. Broadcasting Corporation began using his system. Improvements by the development of the cathode-ray tube were adopted by B. (see TELEVISION). Further developments were interrupted by the outbreak of war in 1939. In Dec. 1941, however, B. showed television in relief and full natural colour. In that year he became technical adviser to Cable and Wireless Ltd., in which position he remained until his death at Bexhill on 14 June 1946. In addition to television, he invented the 'noctovisor,' as a result of experimentation with infra-red rays. This instrument enabled visual impressions to be regarded in total darkness. At the time of his death B. was conducting experiments with a view to enabling cinema audiences to watch events taking place at considerable distances.

Baird, Robert (1798–1863), Amer. clergyman, reformer, and author. He was b. in Fayette co., Pennsylvania, and graduated from Princeton Theological Seminary, 1822. He was agent and secretary of the Amer. and Foreign Christian Union, and worked in Europe on behalf of temperance and a revival of evangelical Protestantism. He wrote *A History of Temperance Societies in the United States*, 1836.

Baird, Spencer Fullerton (1823–87), Amer. naturalist. Graduated from Dickinson College, Carlisle, Pennsylvania, to which he was elected prof. of the natural sciences, 1845. He became assistant secretary of the Smithsonian Institution at Washington in 1850, and secretary in 1878. During this period the National Museum was organised and developed by him. In 1871 he was elected commissioner of fish and fisheries. He wrote numerous books on zoology and Amer. archaeology, the most important being *Catalogue of North American Reptiles*, 1853, *Mammals of North America*, 1859, *Birds of America* (with John Cassin), 1860, and *History of North American Birds* (with Dr Brewer and Prof. Ridgway), 1874–84.

Baireuth, see BAYREUTH.

Bairn's Part of Gear, see LEGITIM.

Bairnsfather, Charles Bruce, artist and journalist, b. Murree, N. Punjab, 1887; eldest son of Maj. Thomas H. B. He was educ. at United Services College and served in Warwickshire Militia, 1911-14. Engaged in civil engineering when war broke out he rejoined the Warwickshire Regiment, going to France Nov. 1914. From 1916 he was attached to the War Office for work abroad. B.'s humorous drawings of army life, at first a subject of official censure, estab. him the war caricaturist *par excellence*. Pubs.: *Fragments from France* (6 vols.), 1916, etc.; *The Better 'Ole* (play); *Bullets and Billets*, 1917; *From Mud to Mufti*, 1919; *Old Bill*, M.P. (play).

Bairstow, Sir Edward (1874-1946), Eng. organist and conductor, b. Huddersfield, Yorks. Served his articles to Sir Frederick Bridge at Westminster Abbey. Organist, Leeds par. church, 1906, and York Minster from 1913 till almost the end of his life. In 1929 he became prof. of music at Durham Univ. His pubs. are chiefly songs, and organ and church choral music.

Baise, or **Bayse**, Fr. riv. It rises in the Haute-Pyrénées, and flows N. to join the Garonne W. of Agen. Length 145 m.

Baius, or **De Bay**, Michael (1513-89), Belgian theologian, b. Melun; studied theology at Louvain, became prof. of scriptural exegesis at the univ. in 1552, and chancellor, 1575. He was a deputy at the Council of Trent, 1563. At Louvain he was the leader of the Augustinian anti-scholastic school of theology. Pius V condemned him in the bull *Ex omnibus afflictionibus*, 1567, for his teaching on justification by faith, sufficiency of the scriptures and grace, free will, and original sin as applied to the immaculate conception. He was again condemned by Gregory XIII, 1579. His school came into conflict with the Jesuits, and later influenced Cornelius Jansen and Jansenism (q.v.). Collected works pub. 1696.

Baixo Alentejo, prov. of S. Portugal, largely co-extensive with Beja dist. (q.v.). There are cork-oak forests, live-stock is raised, and cereals are produced. The prin. tn is Beja. Area 5320 sq. m.; pop. 375,150.

Baize, coarse woollen cloth with a long nap. It was formerly made of a finer texture.

Baja, tn of Hungary, in Bács-Kiskun co., near the Danube (q.v.), 60 m. SW. of Kecskemét (q.v.). It is a mkt tn. and has chemical, textile, engineering, and other industries. Pop. 32,000.

Bajan, see BEJAN.

Bajazet, or **Bayazid**, I (1347-1403), Sultan of Turkey, son of Amurath I whom he succeeded in 1389. His rapid military tactics won him the title Ilderim (lightning). He conquered Bulgaria and parts of Asia Minor, Serbia, Macedonia, and Thessaly. B. gained a decisive victory over the united forces of French, Poles, and Hungarians at Nicopolis in 1396. He was, however, defeated in 1402 near

Angora by Timur, who kept him prisoner till his death. The literary tradition that he was kept in a cage and fed with bits like a dog (cf. Marlowe's *Tamburlaine* and Rowe's *Tamerlane*) is without historical foundation.

Bajazet, or **Bayazid**, II (1447-1512), Turkish sultan, son of Mohammed II. He became sultan in 1481. During his reign he engaged in continuous warfare with his neighbours, particularly with Hungary, Poland, Persia, Venice, and Egypt, but Turkey made few territorial gains, except at the expense of Venice. The last years of his reign were disturbed by the quarrels of his 3 sons about the succession to the throne. He finally abdicated in favour of his youngest, Selim.

Bajimond, see BAGIMOND'S ROLL.

Bakaos, Thomas (1442-1521), Hungarian cardinal and politician. He became Bishop of Erlau (1491), Archbishop of Gran (1497), and Cardinal and titular patriarch of Constantinople, 1510. He directed foreign policy under Michael Corvinus and Ladislaw II but failed in his candidature for the papacy in 1513. He also launched an unsuccessful crusade against the Turks.

Bakar (It. **Buccari**), tn in Croatia, Yugoslavia, on the Adriatic. It is built on the side of a hill, and is a picturesque tn with a ruined castle. Near by is a magnificent beach, bordered by a forest. There is tunny fishing. Pop. 4800.

Bakau, see BACAU.

Bakhichsarai, see BAKHCHISARAY.

Bake, Jan (1787-1864), Dutch classical scholar, b. Leyden. Prof. of Rom. and Gk literature for over 40 years in his native tn.

Baked Shale, see PORCELLANITE.

Bakel, fortified port and chief tn of the B. dist., Senegal, Fr. W. Africa. It is situated on the Senegal R., 85 m. below Kayes, and about 550 m. above St Louis on the coast. It is an important trading centre from the interior. Pop. 37,000.

Bakelite, substitute for celluloid, bone, ivory, etc. It is a carbon compound made from formaldehyde and phenol. B. was invented by the Belgian-Amer. chemist L. H. Baekeland.

Baker, co. seat of B. co., Oregon, U.S.A., on the Powder R. c. 80 m. SE. of Pendleton. It is the centre of a gold- and silver-mining dist. The chief industries are agriculture, lumbering, and mining. It is the H.Q. of Whitman National Forest. Pop. 9470.

Baker, Sir Benjamin (1840-1907), civil engineer. He invented the pneumatic shield; designed, in conjunction with Sir John Fowler, the Forth Bridge, and assisted in the construction of the Nile reservoir.

Baker, David (1575-1641), Benedictine monk, better known by his religious name of Augustine, b. Monmouthshire. He studied law, and, converted to Catholicism, entered a monastery at Padua, and joined the revived Eng. congregation of Benedictines, 1619. He was spiritual director of an Eng. Benedictine convent at Cambrai, and was on a mission

in England when he d. His valuable MS. collection on eccles. hist. is in Jesus College, Oxford.

Baker, Henry (1698-1774), scientist and author, b. London, was at one time a bookseller, but, in 1720, as tutor to a deaf girl, invented a system of teaching the deaf and dumb. He kept his methods secret, and estab. a profitable private school for deaf mutes. He helped Defoe in the *Universal Spectator*, 1728, and married his youngest daughter, Sophia, 1729. His scientific work was concerned with the microscope. He was made a fellow of the Royal Society in 1740, and gained the Copley gold medal for observations on the crystallisation of salts in 1744. He helped in the foundation of the Society of Arts, 1754, and by his will founded the Bakerian lecture of the Royal Society.

Baker, Sir Herbert (1862-1946), architect, b. Cobham, Kent, was articled to Arthur B., then became assistant to Sir E. George, among his colleagues being Edwin Lutyens and Guy Dawber. He won the Ashpitel prize of the R.I.B.A. in 1889. In 1892 he went to S. Africa, and after the Boer War designed many important buildings in that country. He built Groote Schuur for Cecil Rhodes; the administrative buildings for the S. African Gov. at Pretoria; the fine cathedrals of Cape Town, Pretoria, and Salisbury (Rhodesia), and the railway stations at Pretoria and Johannesburg. He designed the Rhodes Memorial on Table Mt. and Rhodes House at Oxford. He designed also the Kimberley siege memorial and the S. African Institute for Medical Research, and he may be said to have created the architectural character of S. Africa. This character combines effectively the ideals of the ruling race, as derived from ant. Rome, with different aspects of the local tradition of building, and in his later work, in India, he revealed the same ability to infuse local sentiment into the classical tradition. Rhodes made it possible for him to visit Rome, Athens, Thebes, and Paestum, and his work in S. Africa shows strongly the dominating influence of Mediterranean architecture. He was associated with Sir E. Lutyens in the designing of the new cap. at Delhi, the secretariat and the legislative buildings being his work. After the First World War he designed the memorials at Neuve-Chapelle and Delville Wood and, in England, the Winchester College war memorial and the Haileybury war memorial hall. His chief work in London was the reconstruction of the Bank of England, a difficult task, which involved adherence to the style of Sir John Soane's original. India House, Aldwych, is a conspicuous example of his ability to introduce a special atmosphere into classic design. Other works: S. Africa House, in Trafalgar Square; Glyn, Mills's bank in Lombard Street; the building of the Royal Empire Society in Northumberland Avenue; London House, Bloomsbury; and Church House, Westminster. He was knighted in 1926; K.C.I.E., 1930; R.A., 1932. His memoirs, under the title

Architecture and Personalities, were pub. in 1945.

Baker, John Gilbert (1834-1920), botanist, b. Guisborough, Yorks; became in 1886 first assistant at the herbarium of the Royal Gardens, Kew, and keeper 1890-9. He was Victoria medallist of the Royal Horticultural Society, 1897, and gold medallist of the Linnean Society, 1899. He was associate editor of the *Journal of Botany*, and pub. botanical works, of which the most important are *Synopsis Filicum*, 1883 (begun with Sir W. J. Hooker), *Flora of the Mauritius*, 1877, *Flora of the English Lake District*, 1885, *Handbooks of the Fern Allies*, 1887, *Amoryllidaceae*, 1888, and *Bromeliaceae*, 1889.

Baker, Josephine Turck (1861-1942), Amer. authoress, b. Milwaukee, Wisconsin. Founded the *Correct English Magazine*, 1899; president and founder of the International Society for Universal English. She pub. *Correct English*, and other similar works; also *Songs of Triumph*, 1933, and 4 plays, including a drama on Mme de Staël.

Baker, Newton Diehl (1871-1937), Amer. politician, b. Martinsburg, W. Virginia, and educ. at Johns Hopkins and Washington and Lee Univs. President Wilson in 1916 appointed him secretary for war. A little over a year later, when the U.S.A. entered the First World War, B. and Wilson decided to adopt conscription almost immediately. The measure was bitterly fought in Congress; nevertheless the law was enacted. B. left office in 1921. He was appointed by Coolidge in 1923 as an Amer. member of the Court of International Justice at The Hague, and in the same year was elected president of the Woodrow Wilson Foundation.

Baker, Ray Stannard (1870-1946), Amer. author. Studied law and literature, Michigan Univ. Became managing editor of McClure's Syndicate, 1897-8; appointed to the special commission of the Dept of State in Great Britain, France, and Italy during the last year of the First World War. Among his numerous pubs. are *The Spiritual Unrest*, 1910, *What Wilson did at Paris*, 1919, and *Woodrow Wilson and World Settlement—a History of the Peace Conference* (3 vols.), 1922. With Prof. E. W. Dodd ed. *The Public Papers of Woodrow Wilson* (6 vols.), 1925-1926. Under the pseudonym of David Grayson: *Adventures in Contentment*, 1907; *The Friendly Road*, 1913; *Hempfield*, 1915; *Adventures in Understanding*, 1925; *Adventures in Solitude*, 1931; *The Countryman's Year*, 1936.

Baker, Sir Samuel White (1821-93), Brit. explorer, was intended for business by his father, a W. India merchant, and went to Mauritius, and in 1846 to Ceylon, where he founded an agric. settlement. He travelled in Asia Minor and E. Europe, and in 1861 started on his explorations of the Nile basin which made him famous. He first explored the Atbara and Ea tribes of the Nile. In 1862 he met Speke and Grant at Gondokoro returning from the discovery of Victoria Nyanza and the main sources of the Nile. With their

information B. discovered Albert Nyanza, 1864, through which he proved the Nile flowed, and the Murchison Falls of the Victoria and Nile. He returned to Khar-toum, 1865. He was given the gold medal of the Royal Geographical Society, and was knighted, 1866. In 1870 the Khedive Ismail appointed him Governor-General of the Nile equatorial dists. for 4 years to suppress the slave traffic and open up the country for trade. Many difficulties prevented his success, but he laid the foundations for Gen. Gordon, his successor. His second wife (married 1861), a Hungarian, Florence von Sass, accompanied him on all his travels. His pubs. include *The Albert Nyanza and the Exploration of the Nile, 1866, Nile Tributaries of Abyssinia, 1867, Ismailia, 1874, and Wild Beasts and their Ways, 1890.*

Baker, Valentine (1827-87), also known as B. Pasha, Eng. soldier, brother of Sir Samuel White B. Entered the army in 1848, serving in the Kafir war, 1852-3; promoted to colonel of the 10th Hussars, 1860; explored the N.E. frontier of Persia, 1873. Having been convicted of a criminal offence, he was dismissed the Brit. Army, 1875, and entered the service of the sultan, 1877, becoming a major-general in the Turkish Army. He took part in the Russo-Turkish war; organised the Egyptian Army for the khedive, 1882-1887, and was defeated by Osman Digna at El Teb, near Tokar, in 1884. On his return to England he joined the staff of Gen. Wolseley, 1885, but his application to rejoin the Brit. Army was refused. Two years later he returned to Egypt and *d.* at Tel-el-Kebir. Author of *Clouds in the East, 1876, and The War in Bulgaria (2 vols.), 1879.*

Baker Mount, volcanic mt. 10,827 ft in height, belonging to the Cascade Range in Whatcom co., Washington, U.S.A.

Bakersfield, co. seat of Kern co., California, on the Kern R., and on the S. Pacific and the Atchison, Topeka, and Santa Fe railroads. It is a stock-raising and fruit-growing dist., and there are machinery works, foundries, oil and natural gas fields, oil refining, pipeline and rail shipping, and the manuf. of oil tools; there are also railroad shops. The manuf. of paint, chemicals, metal products, and farm equipment is also important. Pop. 34,784.

Bakewell, tn in Derbyshire, England, on the R. Wye, 25 m. from Derby. The scenery of the dist. is beautiful; near by are Haddon Hall and Chatsworth (qq.v.). There are Saxon remains on Castle Hill; the church of St Anne is mentioned in Domesday; on its S. side stands an 8th-cent. carved stone cross. Lead-mining was practised from early times, and chert limestone is still worked. The almshouse dates from 1602, the grammar school from 1637. Pop. 3,400.

Bakewell, Robert (1725-95), agriculturist, *b.* Dishley, Leics., England; he devoted himself to the breeding of live-stock; his new long-wool 'Leicester' sheep and the 'Dishley longhorn' cattle became famous. See CATTLE.

Bakhchisaray ('Garden Palace'), tn in

the Crimea, 20 m. S. of Simferopol, a former residence of Crimean khans. It has many historic mosques, and the famous palace of the khans built in 1519. Before 1945 it had a museum of Tatar culture; this was closed, but in 1950 reopened as the Suvorov museum. Pop. (1926) 10,000 (c. 1914, 17,000), before 1945 mostly Tatar.

Bakhmut, see ARTĖMOVSK.

Baking, method of cooking in which food is cooked in a heated oven; the term is also used in connection with the making of pottery (q.v.) and bricks (q.v.). The chem. of the process is explained in the article on cookery (q.v.).

Baking Powder is used to aerate a wide variety of cake, pudding, and biscuit mixtures. It is composed of tartaric acid (or potassium hydrogen tartrate), bicarbonate of soda, and a fine farinaceous substance, usually rice flour. When B. P. is in contact with water the acid reacts with the carbonate and carbon dioxide is evolved. When subjected to heat the gas expands and gives the mixture lightness and porosity. The rice flour in B. P. absorbs the moisture from the atmosphere so that it does not clump during storage.

Bakninh, see BAC-NINH.

Bakony Forest (Ger. *Bakonyer Wald*), wooded mt dist. in Hungary, N. of Lake Balaton and SW. of Budapest (qq.v.). It is an outlying E. portion of the Alps, and is separated from the Carpathians by the Danube (qq.v.). The highest point is Mt Kőrös (2339 ft). Bauxite, manganese, and coal are found, and large numbers of pigs are reared. The forest was the haunt of robbers in Hungarian folk-song. Length about 60 m. The chief tn is Veszprém (q.v.).

Bakonyer Wald, see BAKONY FOREST.

Bakshish (Persian, from *bakhshidan*, to give), word meaning a gift, and used in the Muslim E. of petty almsgiving, also for gifts to procure service, hence equivalent to 'tip.'

Bakst, Leon (1866-1924), Russian painter and designer (real name Rosenberg), *b.* probably at St Petersburg (Leningrad), where he passed his earliest years. He attended the Imperial Academy of Arts; but left after displeasing the authorities there by his painting of a 'Madonna Weeping over Christ,' in which all the figures were Jewish. He was employed to teach the children of the grand duke Vladimir—afterwards his patron in theatrical matters. Associated with Alexandre Benois in the 'World of Art' group, he helped the movement for reviving native Russian art. He was also active in restoring the antique beauty of presentment of the drama of ancient Greece. In the autumn of 1906, exhibited in Paris; in 1908 became famous as the scene-painter of Diaghilev's Russian ballets, 'Scheherazade' (1909) being one of his triumphs. He returned to Russia in 1922; but afterwards resumed residence at Paris, and *d.* there. His brilliant and exotic *décor*s for ballet made a great impression, influencing fashions in dress and interior decoration. See life by A. Levinson, 1923.

Baktashites, see DERVISHES.

Baktohisaral, see BAKKHISARAY.

Baku (Azerb. **Bakki**), cap. of Azerbaijani Rep. and one of the main economic and cultural centres of the Soviet Union. Situated on the W. shore of the Caspian Sea, on the desert-like Apsheron peninsula, it has a hot climate and strong NW. winds. It is the centre of the large B. oil-fields, with refineries and cracking plants and engineering (mainly oil industry equipment), light, and food industries. It is the starting point of the pipeline to Batumi (on the Black Sea). B. is the largest port on the Caspian Sea (shipment of oil to central Russia via Astrakhan). The Azerbaijani Academy of Sciences (founded 1945) and a univ. (founded 1919) are situated here. It has outstanding architectural monuments of 11th–15th cents. Pop. (1956) 598,000 (14th in Soviet Union; 1863, 14,000; 1897, 112,000; c. 1914, 225,000; 1923, 245,000); with industrial settlements of the peninsula subordinated to B. city council (1956) 901,000 (4th in Soviet Union; 1926, 453,000; 1939, 809,000)—mainly Russian, Azerbaijani, and Armenian. B. has been known since the 8th cent. It was under Arab rule, then under Shirvan (q.v.) and Persia; it was Russian 1723–35 and from 1806, became cap. of B. prov. in 1859, of independent Azerb. Rep. 1918–20, and was taken by the Red Army in 1920. It was cap. of B. Oblast within Azerbaijan 1952–3 (abolished).

Bakunin, Mikhail (1814–76), Russian anarchist and revolutionary, b. Tajok, of a noble family. He resigned his commission in the Imperial Guard, and in 1846 met Proudhon, the founder of anarchism, in Paris. Expelled from France in 1848, he shared in the Dresden revolution and was sentenced to death. The sentence was commuted, and he was later handed over to the Russian authorities and exiled to Siberia, 1855. He escaped in 1861, and spent the rest of his life chiefly in Switzerland. He joined the International in 1869, becoming the leader of the more violent Lat. section, styling themselves federalists or anarchists as opposed to the political socialists under Marx. His attacks on his opponents at The Hague Congress of the International, 1872, led to the expulsion of B. and the anarchists. He d. in Bern. His best-known work is *Dieu et l'Etat*; his complete works were pub. in 1905. See THIRD INTERNATIONAL. See also E. H. Carr, *Michael Bakunin*, 1937.

Bala, tn and urb. dist. of Merioneth, N. Wales, an angling centre. B. lies within the Snowdonia National Park and is set in superb scenery. B. College is a preparatory college of the Presbyterian Church of Wales. B. Lake (Llyn Tegid), 4½ m. long by 1 m. wide, is the largest in Wales. Pop. 1500.

Balaam, son of Beor, a Moabite prophet (Num. xxii, xxiii), recognised as inspired by God on this occasion, although a pagan. In other parts of the Bible (e.g. 2 Peter ii. 15, Rev. ii. 14) he is reproved for loving the 'wages of unrighteousness.' Jewish

tradition was always unfavourable in its judgment of him. Balak, King of Moab, alarmed at the victories of Moses and the Israelites, sends twice with promises of reward to summon B. from Pethor on the Euphrates. Forbidden at first, he temporises until commanded to go, but only to speak the words God puts into his mouth. On his way occurs the incident of the angel and the speaking ass. Three times B.'s curses are turned to blessings, at the high places of Baal, Pisgah, and Peor. These blessings form 7 poems: (1) Num. xxiii. 7–10, the power of Israel; (2) and (3) xxiii. 18–24, xxiv. 3–9, the coming monarchy; (4) xxiv. 15–19, the rise of the star and sceptre out of Jacob; (5), (6), and (7) xxiv. 21–23, the doom of Amalek, conquest of the Kenites by Assyria, the ships from the W., Chittim (Cyprus), to overthrow Assyria. The last 3 poems are considered a later addition by modern critics, who trace 2 distinct versions in the story of Numbers. B. was slain in the punishment of Moab (Joshua xiii. 22).

Balachong, Chinese condiment made of putrid shrimps or small fish pounded with spices and salt and then dried and eaten with rice.

Balaclava, see BALAKLAVA.

Balad, see BELED.

Balaena, see RIGHT WHALE.

Balaeniceps (Lat. *balaena*, whale; *caput*, head), shoebill or whale-headed stork. The single genus and species *B. rez* is put into a distinct family Balaenicipitidae. The shoebill, which is a large, long-legged bird standing about 5 ft high, lives in swampy areas of the upper White Nile and in parts of Uganda and the Belgian Congo. It feeds on fish, frogs, snakes, various molluscs, and carrion.

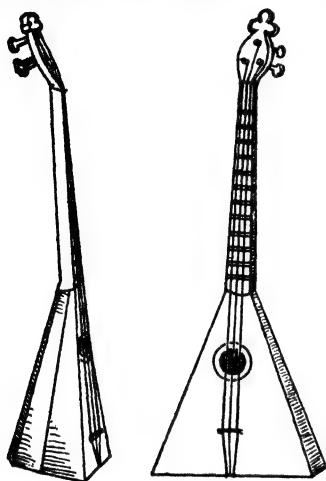
Balaenoptera (Lat. *balaena*, whale; *Gk pteron*, wing), name given by Lacépède to the fin-whales (q.v.) or rorquals.

Balakhissar, see BALKHESRI.

Balakirev, Mily Alexeevich (1837–1910), Russian musical composer, b. Nizhni-Novgorod. He was the acknowledged leader of the Russian 'Nationalist' school of the fifties, and carried on the tradition of Glinka. It was in 1861 that he began to attract around him promising musicians like Borodin, (q.v.), Mussorgsky (q.v.), and, later, Rimsky-Korsakov (q.v.), and on all of them he exercised great influence, and also upon composers who were not his pupils, such as Tchaikovsky. In 1867 he became conductor of the Imperial Russian Musical Society. In 1881, after some years of seclusion, he returned to St Petersburg with his masterpiece *Tamara*. As a composer B. is original, even though he reveals the influence not only of Glinka, but also of Chopin, Liszt, Schumann, and, to a lesser degree, of Berlioz. Although he wrote 4 overtures, 2 symphonies, and 2 piano concertos, the largest part of his output consists of piano solos and songs. He d. in St Petersburg.

Balaklava, tn in the Crimea, on the Black Sea about 10 m. S. of Sevastopol. Pop. (1923) 1600. In 1854–6 it was held by the British; near B. the famous charge on the Russian guns was made by the Light Brigade (Six Hundred).

Balalaika, form of the guitar common in Russia, where it is used by the peasants to accompany popular songs. It has a triangular body, and usually 3 strings, and is made in various sizes.



BALALAIKA

Balance (Lat. *bi-*, twice; *lanx*, a dish), instrument for comparing the masses of bodies. The application of the term is extended to any condition of equilibrium, as in B. of power (q.v.), and also to the excess of one quantity over another, or the quantity necessary to establish equilibrium, as in B. of trade (q.v.), and the credit or debit B. in a book-keeping account.

The common B. consists essentially of a beam resting at its middle point upon a fulcrum and furnished at its extremities with 2 scale pans; the goods to be weighed are placed in one of these, and known weights (strictly speaking, masses) placed in the other until the beam assumes a horizontal position. The B. thus constitutes a lever of the first class, the condition of equilibrium being estab. by the force rotating the beam in one direction being counteracted by an exactly equal force tending to rotate the beam in an opposite direction. In order that the B. should give a true result, the following conditions must exist: (1) The 2 arms of the beam must be precisely equal in length, otherwise a weight depending from the end of the shorter arm will be balanced by a smaller weight on the longer arm, as in the steelyard. A sufficient test is provided by placing weights in the 2 pans until the beam is horizontal and then interchanging the weights, when the beam should become horizontal again. (2) The B. should be in equilibrium when the scales are empty. This does not necessarily mean that the

arms are equal, for unequal arms may be compensated for by pans of unequal weight; this condition would give an incorrect result, a weight in the lighter pan on the longer arm having more additional turning power than an equal weight in the heavier pan on the shorter arm. (3) The centre of gravity of the beam and pans should be in the same vertical line as the fulcrum when the beam is horizontal, and should be a little below the fulcrum, otherwise the slightest displacement would result in the beam toppling right over.

A B. is said to be delicate, sensible, or sensitive when a small additional weight in one pan causes an appreciable rotatory movement of the beam, that is, when the angle moved through by the beam is large for a small difference in the weights at either end. Delicacy may be obtained by attention to the following points: (1) The arms of the B. should be made as long as is consistent with lightness and rigidity, for the longer the arm is, the greater will be the turning power of a small weight. (2) The weight of the beam should be as small as is consistent with rigidity, for the amount of rotation should depend as much as possible on the weight in the pan, or, in other words, the weight in the pan should be the greatest possible proportion of the total weight tending to turn the beam about its fulcrum. These two conditions are often met by making the beam of aluminium and constructing it so that it is capable of bearing the greatest strain without bending in a vertical direction. (3) The centre of gravity of the beam should be brought a very little below the point of support, so that the weight of the machine should tend as little as possible to keep the beam in a horizontal position. (4) Friction should be reduced to a minimum. To effect this, the edges from which the beam and pans are supported are made as sharp and as hard as possible, and the surfaces on which they rest as smooth and as hard as possible. The edges are therefore often made of agate and the surfaces of polished steel. Additional sensitivity is imparted to the machine by the use of a long vertical pointer attached to the middle of the beam, the slightest deflection of which causes a considerable arc to be described by the end of the pointer.

It is sometimes necessary that a B. should be stable, that is, that the beam should return as quickly as possible to the horizontal position after deflection. To effect this, it is necessary that the centre of gravity of the beam and pans should be some distance below the fulcrum, so that when the beam is deflected, and the centre of gravity therefore no longer vertically beneath the fulcrum, the weight of the machine will operate in bringing the B. to rest again. This condition is the reverse of that required for sensibility, so that the properties of stability and sensibility are in some degree incompatible. In commerce, where quickness of weighing is desirable, stability is aimed at; whilst in physical and chemical research, where accuracy is of prime importance, the centre of gravity of the B. is brought close

to the fulcrum. Excessive oscillation of the beam can be avoided by the application of a damping mechanism, e.g. hollow pistons moving in cylinders with one end closed, or electromagnetic devices. In the delicate B.s used for chemical analysis, the distance of the centre of gravity from the fulcrum can be regulated within small limits by the use of a screw on the beam vertically above the fulcrum, turning the screw so that it rises, bringing the centre of gravity nearer the fulcrum, and vice versa. Such B.s are protected from air currents, dust, etc., by being enclosed in glass cases, with sliding fronts. Strong sulphuric acid, caustic potash, or some other dehydrating substance is usually exposed in dishes to absorb moisture from the air. The wearing of the parts in a chemical B. is obviated by allowing the

weights, but if the B. is false through the pans being unjustly loaded, the true weight will be the arithmetical mean of the apparent weights.

Roberval's B. consists of 4 rods hinged smoothly in the form of a parallelogram. In its position at rest the rods form a rectangle, the weight pans being firmly fixed to the vertical rods, and the horizontal rods free to turn about their middle points, which are supported by fixed vertical uprights. Whatever movement takes place, the 4 movable rods form a parallelogram, those supporting the weight pans always being vertical. The vertical work done in displacing one of the pans downwards is therefore always equal and opposite to the virtual work done in displacing the other, no matter on what parts of the platforms the weights may be placed. This form of B. is commonly used for weighing letters and parcels.

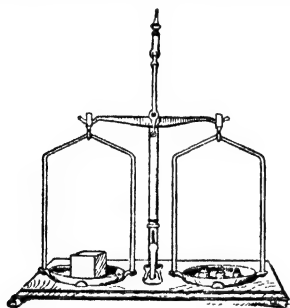
Beranger's B. is at first appearance much more complicated than Roberval's B.; but in reality is not so. The principle of placing the pans above the beam is retained, but all loads on the pans are transferred to subsidiary beams arranged below the main beam, which, in their turn, transmit a pull, always vertical and equal to the load, to the sharp edges of the main beam, and, by this means, the intervention of lateral forces is avoided.

The common or Rom. steelyard is a lever of the first class, but equilibrium is obtained by varying the distance of the weight from the fulcrum instead of varying the weight. It consists of a beam movable about a fulcrum near the end, from which is suspended the body to be weighed. A weight is moved along the long arm until the beam balances horizontally. Graduations on the long arm indicate the weight.

The Dan. steelyard consists of a bar with a heavy knob at one end and a hook at the other from which the body to be weighed is suspended. In this case the fulcrum is movable, and usually consists of a loop of string, its position with respect to graduations on the bar indicating the weight of the body.

The bent lever B. consists of a lever of unequal arms, the lighter of which ends in a pan to receive letters or small parcels. The other arm is bent downwards and weighted, and moves in front of a graduated arc. The nearer the weighted arm is to the horizontal position the greater is its turning power, as the weight acts at a greater distance from the fulcrum. Therefore the weight of the body placed in the pan is determined by the extent to which it lifts the weighted arm. The instrument is generally graduated empirically.

The spring B. consists of a steel wire wound in the form of a spiral, and usually enclosed in a cylindrical case with a slot through which the spring is attached to a pointer moving along a vertical scale. The body to be weighed is suspended by a hook, or placed in a pan attached to the bottom of the spring, and the weight is indicated by the amount of stretching that the spring undergoes. The elasticity



THE COMMON BALANCE

beam and pans to rest on suitable supports when not in use, the knife-edges being brought into contact with their surfaces by moving a screw in front of the instrument. A graduated scale behind the pointer renders it unnecessary to wait for the B. to come to rest at each weighing, as equal deflections either side are quite sufficient to indicate equal weights. A small 'rider,' or movable piece of wire, can be used to bring the B. into equilibrium when the difference in weights is very small; the rider is moved along the beam towards its extremity over small graduations, the motion over one graduation being generally equivalent to an additional weight of one-hundredth of a grain.

Even if a B. be not accurate in itself, a good result may be obtained by double weighing. The body to be weighed is placed in one pan and shot or sand is poured into the other until the beam is horizontal. The body is then taken off and known weights are placed in the pan until the beam is again horizontal. The result will be accurate even if one of the pans is loaded. Another method consists in placing the body to be weighed in the 2 pans successively and obtaining 2 results. If the fault of the B. is that it has unequal arms, the true weight will be the geometrical mean of the apparent

of the spring varies with time and use, and as it is used directly against the force of gravity, the readings of such an instrument vary in different parts of the world. This B. measures weight and not mass.

The *torsion B.* consists of a fine wire clamped at one end and carrying an index swinging in a horizontal plane at the other. The angle through which the index is twisted is proportional to the force causing the torsion. The index is usually a magnetic needle, and the instrument is used to measure the force of magnetic attraction and repulsion. See WEIGHING MACHINE.

Balance of Power, in diplomacy, the principle of maintaining an equilibrium between states or groups of states so that no single state or group becomes overwhelmingly powerful. In diplomatic relations the principle of the B. of P. has operated from the earliest times, e.g. in the leagues of the Gk city states; the maze of wars and alliance of the Il. repubs.; or the attempt of Wolsey and Henry VIII to make England the balancing power in Europe. In the 17th and 18th cents. the B. of P. was recognised as a definite formula of diplomacy. It was the guiding principle of William III in his lifelong struggle against Louis XIV. It explains the tangled diplomacy and constant wars of the 18th cent., culminating in the coalition of all the powers against Napoleon. Canning's famous remark, 'I called the New World into existence to redress the balance of the Old,' in regard to his recognition of the revolted Sp. colonies in S. America, illustrates the vitality of the theory. The years before the First World War confirmed its place as a principle of modern European policy; the Triple Alliance was countered by the Dual Alliance, and by her *entente* with France and the later agreement with Russia, Great Britain left her 'splendid isolation' in order to maintain the equilibrium threatened by the increase of Ger. power and the weakness of Russia. The estab. in 1918 of the League of Nations was an attempt, in the words of Asquith, to form 'a community of power' to replace the B. of P. European public opinion has become more influenced by opinion in the U.S.A., which has always been, in theory at least, against the B. of P. While formerly the principle was confined to European diplomacy, the tendency was to extend it to world politics; China and the Middle E. came into its sphere; the rise of Japan made the B. of P. in the Pacific a vital question for the future of Australia, and, as the event proved, not for Australia alone. The end of the Second World War revived the ideal of substituting an international authority for diplomacy based solely on the B. of P. See UNITED NATIONS. See also the *Cambridge Modern History*.

Balance of Trade, *the*, is a term applied to the difference in value between the exports and imports of a country. The Mercantilists (see MERCANTILE SYSTEM) held that the wealth of a country depended on the difference in gold between its exports and imports; if there was an

excess in the value of exports over the value of the imports, the balance was in favour, it not the balance was against the country. In consequence legislation tended to protect the exports and place prohibitive taxes on the imports. This theory is now regarded as fallacious.

In addition to the exports and imports of commodities, settlements in respect of freights, insurances, loans, interest on loans, expenses of gov. abroad, receipt of tribute, etc., have to be made. These are known to economists as *invisible* exports and imports. For many years Britain was able to absorb an excess of imports in actual commodities over exports, an excess which was measured by many millions of pounds. This excess was paid for by the money received for *invisible* exports. In 1932, however, Great Britain abandoned its policy of free imports and instituted a tariff scheme, thereby gradually reducing the gap between imports and exports. But during the Second World War Great Britain was compelled to sell her foreign, and particularly her Amer., securities in order to find foreign currency, and especially dollars, to finance her war requirements. In consequence imports in the shape of interest or dividends on foreign investments were much reduced. Hence, after the war the country bent all its efforts on manufacturing for the export trade in the hope of reducing the great adverse balance of trade.

Putting aside *invisible* services, the money value of exports must equal the money value of imports in theory, and the relative prices of commodities must be adjusted in such a manner as to attain this equality. If this adjustment were not made, the country with an excess of imports must export money for as long as the excess continued. This outflow of money would reduce prices to a point when it paid to export some commodities or not to import others. In other words, exports would be increased and the imports reduced and the B. of T. would be restored. New Zealand attempted to do this in 1938-9 when the Labour Gov. there, having spent large sums on social services, endeavoured to restore the balance by a drastic prohibition of all kinds of imports. Other modes of redressing an adverse balance are by the payment of export bounties or subsidies, and by barter agreements. See also BREITON WOODS AGREEMENT; GOLD AND DOLLAR RESERVES; TRADE.

Balance Spring, see WATCH.

Balanchine, George (1904-), Russian choreographer. *b.* St Petersburg. His early years were spent at the Imperial (later Soviet State) School of Ballet. He was with the Diaghilev Ballet from 1924 until 1929, and since 1933 has worked mainly for Amer. companies, notably the New York City Ballet, although he was engaged at the Paris Opéra for some months in 1947. Among his best-known ballets are *Le Fils prodigue*, 1929, *Cotillon*, 1932, *Concerto Barocco*, 1941, *Ballet Imperial*, 1941, and, revived for the Solder's Wells Ballet in 1950, *Palais de*

cristal, 1947, *Orpheus*, 1948, and a new version of *Casse-Noisette*, 1954. The most musical of modern choreographers, B. uses his wide range of invention within the limits of classical technique, and excels in abstract ballets which aim at translating the spirit of the music into movement.

Balanga, cap. of Bataan, on the is. of Luzon, Philippines, on the W. side of Manila Bay, 31 m. from Manila. There is irrigation from the R. Talisay. Pop. 12,379.

Balaninus, genus of coleopterous insect of the family Curculionidae which includes many species of small size. The members of this genus have a long snout furnished with a pair of horizontal jaws which assist in placing the eggs in the kernels of fruit. The egg hatches into a larva, when the creature feeds on the host-kernel, bores a hole through it, and assumes the pupa state when it has burrowed into the ground. They are cosmopolitan. *B. nucum*, the nut-weevil, attacks common nuts and filberts; *B. glandium* the acorn.

Balanoglossus (Gk *balanos*, gland; *glossa*, tongue), the typical genus of the Balanoglossidae of the protochordate group Enteropneusta. It has a worm-like, elongated body, breathes by means of gill-slits, and bears in the anterior region a curved-shaped proboscis which serves as a burrowing organ. It inhabits the sand of various seas, and about 10 species are known.

Balanophoraceae, family of parasitic dicotyledons comprising many tropical species. The chief genus is *Balanophora*, which consists of 11 species growing in India.

Balanus (Gk *balanos*, acorn, gland), the scientific name by which is indicated the barnacle (q.v.) or acorn-shell (q.v.).

Balacan, or **Balang**, tn in the prov. of La Union, Luzon, Philippines, 15 m. N. of San Fernando; pop. 12,274.

Balard, Antoine Jérôme (1802-76), Fr. chemist, b. Montpellier; d. Paris. He became prof. of chem. in his native tn, and in 1826 he discovered bromine (q.v.). In 1844 he was elected member of the Academy of Sciences, and in 1851 was appointed prof. of chem. in the College of France.

Balaruc (-les-Bains), Fr. spa in the dept. of Hérault, on the étang de Thau (q.v.). It has a petrol refinery. Pop. 1600.

Balas Ruby, term used to designate the rose-red varieties of spinel (q.v.). It occurs as crystals, softer than those of the oriental ruby, a much more valuable stone. B. R.'s are found chiefly in India. As the name indicates, it has often been confused with the ruby.

Balashov: 1. Oblast in Central Russia, SE. of Moscow, situated on the Oka-Don lowland, in the black earth belt. Area 14,700 sq. m.; pop. (1956) 964,000, almost entirely Russian. It has wheat and sunflower growing and food industries. The prin. tns are Balashov, and Borisoglebsk. Unpopulated until the 16th cent., the area was then colonised by Cossacks.

2. Cap. of the above, on the Khopër, a

trib. of the Don, 125 m. W. of Saratov. It was founded in the 17th cent., and is a railway junction and local industrial centre, with an aircraft plant and extensive food industries. Pop. (1956) 56,000.

Balasore, tn, in Orissa State, India, near the sea coast. It was formerly of commercial importance and Dutch, Danes, English, French, and Portuguese all estab. centres here.

Balassagyarmat, tn of Hungary, in Nógrád co., on the R. Ipoly, 22 m. W. of Salgótarján (q.v.). It is near the Czechoslovak border, has an archaeological museum, and has a trade in agric. produce, wine, and alcohol. Pop. 12,500.

Balassi, Baron Bálint (1854-94), Hungarian poet, b. Zólyom, wrote lyric poetry of great freshness and beauty, for which he used new verse-forms. He d. at Esztergom, fighting against the Turks.

Balata, juice or latex obtained from *Mimusops balata*, the bullet or bully tree, belonging to the same family, Sapotaceae, as the Malay gutta-percha tree (or *Dichopsis*). B. is used as an inferior substitute for caoutchouc and gutta-percha, but the presence of resin in the latex renders it useless for electrical purposes. It is used for belting, on account of its strength. The B.-tree grows in the W. Indies, S. America, and in Guiana.

Balaton (Ger. *Plattensee*), lake in W. Hungary, lying S. of the Bakony Forest (q.v.). It is the largest lake in central Europe (length 48 m.; width 74-10 m.; area 245 sq. m.) and has an outlet to the Danube (q.v.). The N. shore is hilly, with reed-grown inlets, whereas the S. shore is generally flat; on both shores there are bathing, health, and fishing resorts. The surrounding dist. is very beautiful, and produces vines and fruit. It was the scene of desperate fighting during the Russian invasion of Hungary in 1944 (see EASTERN FRONT).

Balausta, fruit of the pomegranate (q.v.), in appearance a golden colour, about the size of an ordinary orange, and the rind is thick, enclosing numerous seeds, each embedded separately in pulp surrounded by a cell-wall. This pulp is in reality the outer layers of the seed-coats, and it is employed in the manuf. of cooling drinks.

Bayan, seaport of the is. of Luzon, Philippines, in the prov. of Batangas. It is situated 30 m. NW. of Batangas, and at the NW. end of the Bay of B., which is deep, but open to southerly winds. It produces coco-nuts, corn, rice, and sugar. There is fishing. Pop. 18,305.

Balbec, see BAALBEK.

Balbi, Adriano (1782-1848), It. geographer and statistician, b. Venice; became prof. of geography at Murano on the pub. in 1803 of his *Survey of Political Geography*. In 1813 he was appointed to the customs at Venice. His best-known works were *Atlas ethnographique du globe*, 1826, and the *Abrégé de géographie*, 1832. His son, Eugenio (1812-84), ed. his writings, 1841, and was also a geographer.

Balbinus, Decimus Caelius Calvinus,

Rom. emperor (AD 237-8). On the death of the 2 Gordians in Africa, B. and Maximus (Clodius Pupienus) were chosen joint emperors to continue the opposition to the usurping Emperor Maximinus, then with the army in Pannonia. Their powers were equal, and each bore the titles of pontifex maximus and princeps senatus. Maximinus invaded Italy, but was assassinated by his soldiers at Aquileia. On the approaching departure of Maximus against the Persians and of B. against the Goths, the Praetorian guard, adherents of the dead Maximinus, put the 2 emperors to death. B. had gained some reputation as a poet and orator, and both he and his colleague were of the highest rank and character in the senate.

Balbo, Italo (1896-1940), It. marshal and airman, b. Quartesana, Ferrara. In the First World War he served in an Alpine regiment. By 1920 he had become a Fascist and was organising 'flying squadrons,' which made attacks on Communists and Socialists. Mussolini put him in charge of the Blackshirt Militia, and in the 'March on Rome,' Oct. 1922, B. was one of the quadrumvirs who led the Fascists. In the Fascist regime he became under-secretary of national economy; but his chief work was the regeneration of the It. air force, which he lifted out of mediocrity to the point of challenging comparison with any other in Europe at the time. B. himself made a number of spectacular and much-publicised flights. In 1929 he was appointed air minister. He was promoted to marshal 1933. In Nov. 1933 Mussolini took over the Air Ministry and made B. Governor-General of Libya, the general assumption being that Mussolini was jealous of his popularity and wanted to exile him. He was killed at Tobruk (which he had converted into a strong air and naval base) in June 1940, together with 9 other occupants of a plane which crashed there. The Brit. Foreign Office denied the It. announcement that he had fallen in action against the R.A.F., and it was rumoured that his machine had been deliberately shot down by the Italians themselves.

Balboa, Vasco Núñez de (1475-1517), Portuguese discoverer and adventurer who settled a colony at Santa María in the Gulf of Darien in 1513. He subsequently marched across the isthmus of Darien and discovered the Pacific Ocean. He was superseded in his command, but was appointed lieutenant-governor of the countries on the Pacific coast, and married the daughter of Pedrarias Dávila, his successor at Darien. He was accused of disloyalty, and put to death by Pedrarias.

Balboa, monetary unit of the rep. of Panamá. It is of the same size and fineness as the U.S.A. silver dollar, but is maintained equivalent to the gold dollar.

Balboa Heights, H.Q. of the administrative organisation known as the Panama Canal; also H.Q. of trans-isthmian railroad. Pop. 364.

Balbriggan, seaport in co. Dublin, Rep. of Ireland, 22 m. N.E. of the cap., noted for

its hosiery manuf. and its hot salt-water baths. Pop. 3000.

Balbus, Lucius Cornelius, Rom. soldier, native of Gades (Cadiz), in Spain. He served under Pompey in the war against Sertorius, for which he received Rom. citizenship. Prosecuted on a charge of illegal assumption of the citizenship, he was defended by Cicero and acquitted. He was chief engineer to Caesar in Gaul, looked after his affairs in Rome during the civil war, and was the first foreigner to become consul (40 BC).

Balcarres, see CRAWFORD AND BALCARRES, EARLS OF.

Balchen, Sir John (1670-1744), Brit. naval officer. He first served in the W. Indies, then in the N. Sea, 1703-5, and on the coast of Guinea, 1705. He was twice captured by the French—when he was in command of the *Chester*, 1707, and when in command of the *Gloucester*, 1709. He again served in the W. Indies, 1715-16, and in the Baltic, 1719-27. In 1728 he was appointed rear-admiral, in 1734 vice-admiral, in 1743 admiral, and 1744 governor of Greenwich Hospital. He was lost with his ship off Alderney, Oct. 1744.

Balchin, Nigel Marlin (1908-), author, b. Wilts. Educ. at Peterhouse, Cambridge, he later combined business with authorship. During the Second World War he was Deputy Scientific Adviser to the Army Council, and attained the rank of brigadier. He wrote humorous sketches for *Punch*, which were collected as *How to Run a Bassoon Factory*, 1934, under the name 'Mark Spade'; *Business for Pleasure* followed in 1935. *The Small Back Room*, 1943, is a novel of the Civil Service. Others of his books are *No Sky*, 1934, *The Simple Life*, 1935, *Income and Outcome*, 1936, *Darkness Falls from the Air*, 1942, *Mine Own Eccutioner*, 1945, *A Sort of Trailors*, 1949, *The Anatomy of Villainy*, 1950, and *Private Interests*, 1953.

Balcony, railed gallery in front of a window. That it was not always placed before a casement is proved by its origin, as it was built out from the sides of fortified places to enable the defenders to throw stones and boiling liquid on the besiegers. Its introduction in dwelling houses dates from the early part of the 15th cent. It, in origin, it soon became popular in other countries.

Bald Buzzard, see OSPREY.

Baldachin, Baldaquin (It. *Baldacchino*), Sp. term originally applied to a rich brocade made in Bagdad; then to canopy hung with such brocade and fixed over a throne or altar; finally to an isolated structure over an altar. The finest example is the great bronze *baldacchino* over the high altar of St Peter's in Rome (1633).

Baldassaro da Belgioioso, see BALTAZARINI.

Balder, Norse god of light, son of Odin and Frigg, and husband of Nanna; the Scandinavian Apollo. The gods knew that if evil happened to him it would be the signal for their overthrow, and so Frigg laid every object, quick and dead, under an oath to refrain from hurting him. Loki, the god of evil, however,

found that this oath had not been administered to the mistletoe plant, which was thought too young and weak to hurt anyone. Profiting from the omission he threw a sprig of it at B., who fell down dead. Hel, goddess of the dead, offered to restore him to life provided all things wept for him. But Loki refused and B. was lost. The B. myth is regarded by some authorities as a remnant of tree-worship, by others as a ritual myth, but it is more probably a sun-myth, the slaughter of the luminary by the malevolent powers of winter. The mistletoe may have been originally a name of derivation, a magic sword, *Mistelleinn*, totally different from that of the plant, which is unknown in Iceland, whence the oldest known form of the myth comes. See F. Knauffmann, *Balder: Mythos und Sage*, Strassburg, 1902.

Baldi, Bernardino (1553-1617), It. poet and scholar, b. Urbino. He wrote a number of works in prose and verse, the greater part of which have remained unedited. Among those pub. are a poem on navigation *La Nautica*, 1590, eclogues, and several prose dialogues. He also compiled a short chronicle of all the mathematicians known from Euphorbius down to his own time, and he pub. 2 Lat. works on Vitruvius.

Baldi, Lazzaro (1623 or 1624-1703), It. painter and engraver, b. Pistola. He studied under Cortona at Rome, and became a clever imitator of that master. His works include: at Rome, 'Annunciation' in the church of San Marcello; 'The Virgin, St Catherine, and St Bridget,' in the church of Santa Maria della Pace; and 'St John, the Evangelist,' in the basilica of St John Lateran.

Baldinucci, Filippo (c. 1624-c. 1696), It. art historian. He pub. a work on the hist. of the painters from Cimabue (1260) to 1670 (1681-8, 1767-74); and a hist. of the most celebrated engravers and their work (1686).

Baldivia, see VALDIVIA.

Baldmoney, see MECUM.

Baldness, absence of hair upon the scalp, which may be a sign of old age or may be congenital. Senile B. (*calvities* or *calvitium*) is much more common in men than in women. Until the prime of life is passed, new hairs grow to replace the dead ones that fall out daily; it is not till failure in the nutrition of the scalp occurs that B. begins. Congenital B. (*hypotrichosis congenita*) usually gives place in time and with treatment to a natural growth of hair, but may last through life. B. that is not senile or congenital is generally due to ill health, though it may be hereditary. Pre-senile B. or premature alopecia in men may be due to wearing tight leather bands inside the hat or closely fitting waterproof and cloth caps. It may also be due to seborrhoeic dermatitis, the characteristic of which is extreme scurfiness of the scalp. Nervous complaints, anaemia, child-bearing, and favus are all said to be causes of B. B. in patches, see ALOPECIA.

Baldo, Monte, see GARDA, LAKE OF.

Baldock, urb. dist. in Herts, England,

on the Great N. Road. It has a 14th-cent. church. Hosiers are manuf., and there is an electrical industry. Pop. 6300.

Baldovinetti, Alesso (c. 1426-99), It. painter, b. Florence. From what is known of him it is evident that B. was one of the most eminent of the early masters of the Florentine renaissance, though his extant work shows some imperfections in colour and according to Vasari he ruined much work by experiment in his medium. In the representation of details he had real merits and he was famous for his extensive views of landscape background, while the profile 'Portrait of a Lady' (National Gallery) is excellent. Of his pictures the best known are an 'Enthroned Virgin and Child' with 6 saints, now in Florence; his own portrait in the Bergamo gallery; and 'The Nativity,' a large fresco in the cloisters of the Santa Annunziata (1460). He d. at Florence. See R. W. Kennedy, *Alesso Baldovinetti*, 1938.

Baldrey, Joshua Kirby (1754-1828), engraver and draughtsman. His works consisted of portraits after Reynolds, which were exhibited in the Academy in 1793 and 1794; religious subjects as 'The Finding of Moses' (1785), after Salvator Rosa; classical subjects as 'Diana,' after Carlo Maratti; his *chef-d'œuvre* is the E. window of King's College Chapel, Cambridge. In 1818 he pub. a work on the windows of that chapel.

Baldric (O.F. *baudret*, belt), broad belt, often of ornate design, worn in the Middle Ages across the body from shoulder to waist diagonally, used for supporting a quiver, or even a sword.

Balducci, Francesco (1600-42), It. poet b. Palermo. His *Rime* estab. his reputation as an anacreontic poet, and he also wrote *Canzoni siciliane*.

Baldung, Hans (c. 1484-1545), called also Hans Grün, Ger. painter and wood-engraver, the contemporary and friend of Albrecht Dürer. He was b. at Gmünd, in Swabia, but lived chiefly in Switzerland, at Strasburg, and its neighbourhood. His woodcuts are variously signed H. B., H. B. G., and H. G. As a painter he was little inferior to Albrecht Dürer in colouring and richness of detail. His works include 'The Adoration of the Kings' (Berlin) and 'Crucifixion' (Basel), and some allegories that show a fantastic imagination.

Baldwin, name of sev. cities, townships, and post-vils. of N. America. It is also the name of a co. of Alabama, which is bounded on the S. by the Gulf of Mexico and has Bay Minette for its cap. Pop. 40,977.

Baldwin (d. 1190), Archbishop of Canterbury during the reigns of Henry II and Richard I. He became a monk and later abbot in the Cistercian abbey of Ford, Devonshire. In 1180 he became Bishop of Worcester. In 1184 Henry II had him appointed to the see of Canterbury, in spite of the opposition of the monks. In 1189 he crowned Richard king at Westminster. B. successfully asserted the pre-eminence of the see of Canterbury, forbidding the bishops of

England to receive consecration from any other than the Archbishop of Canterbury. Having made a visitation in Wales, preaching the Crusade, B. took the cross and followed Richard to the Holy Land (1190). He d. at Acre in the same year. B. wrote *De Sacramento Altaris* and other religious treatises.

Baldwin, name of sev. counts of Flanders. The countship was founded by B. I, Bras de fer (Iron Arm). He married Judith, the daughter of Charles the Bald, without her father's knowledge, which brought about war between Flanders and Aquitaine. He d. in 879 at Arras.

Baldwin IV, 'the Handsome,' was guardian to Phillip, the young King of France, during his minority, 1060-7. B. married his daughter Matilda to William of Normandy, whom he accompanied to England on the Conquest. He d. in 1067 and was buried at Lille. Five other B.s succeeded to the countship, the most important being B. IX (c. 1171-1205), who became first Lat. Emperor of Constantinople.

Baldwin I (c. 1171-1205), Lat. Emperor of Constantinople, b. Valenciennes. He joined the fourth crusade in 1200 as Count of Hainault and Flanders, and took part in the capture of Constantinople on behalf of Alexis, son of Isaac II, Emperor of Constantinople, against his uncle, the usurper, Alexius Angelus. Alexius was unable to keep his promises with regard to payment, and in consequence was murdered and Constantinople was sacked. B. was chosen emperor and crowned in 1204, his kingdom comprising only the city of Constantinople and its surroundings, and a few is. in the Aegean. The Greeks with the help of the Bulgarians massacred the Latins in Thrace; B. laid siege to Adrianople, but was defeated and taken prisoner by John, King of Bulgaria, 1205, and d. in captivity shortly afterwards.

Baldwin II (1217-73), Lat. Emperor of Constantinople, son of Peter II (de Courtenay) and nephew of B. I, became emperor in 1228, but was not crowned till 1239, John of Brienne, his father-in-law, acting as regent during his minority. In 1261 he was driven out of his cap. by Michael Palaeologus, ruler of Nicaea, and took refuge in Italy.

Baldwin I (1058-1118), King of Jerusalem, son of Eustace, Count of Boulogne, and of Ida of Lorraine. He accompanied his 2 elder brothers, Godfrey and Eustace, to the first crusade in 1096, but left the main body of the crusade in 1097 and succeeded in obtaining the lordship of Edessa in Armenia. On the death of Godfrey, 1100, he was called to succeed him in Jerusalem. He became protector of the Holy Sepulchre, and assumed the regal title, which his brother had refused, and was crowned on Christmas Day, 1100. He carried on continual warfare against the Turks; he conquered Caesarea, Arsuf, and Jaffa, 1101, Acre, 1103, and Sidon, 1111. He was the true creator and consolidator of the kingdom of Jerusalem.

Baldwin II, du Bourg (d. 1131), Count of Edessa, succeeded his cousin B. I as

King of Jerusalem, where he reigned from 1118 to 1131. During his reign Tyre was taken (1124), and the military and religious orders of the Templars and Hospitalers were instituted for the defence of the Holy Land. He renounced the throne in favour of his son-in-law, Fulk of Anjou, in 1131, and retired to the monastery of the Holy Sepulchre, where he d. in the same year.

Baldwin III (1129-62) succeeded his father, Fulk of Anjou, King of Jerusalem, in 1143. Under his reign the Christians lost Edessa, which was taken by storm in 1144 by Zenghi, Turkish Prince of Aleppo and father of the famous Nur-eddin, or Nureddin. B. had to struggle during the greater part of his reign with the power and abilities of Nur-eddin. Louis VII of France and Conrad III, Emperor of Germany, joined B.'s forces in an attempt upon Damascus, in which they failed. After his death the Christian kings soon began to lose their power in the E. He was succeeded by his brother, Amalric or Amaury, who d. in 1174.

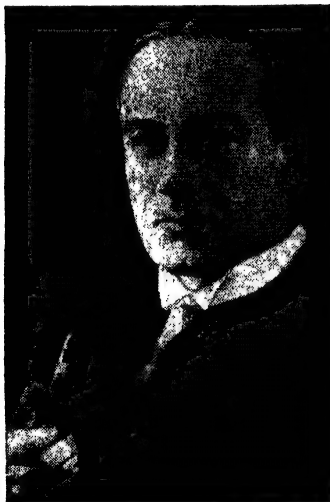
Baldwin IV (d. 1186), the Leper, son of Amalric, reigned as King of Jerusalem from 1174 to 1185, when he resigned in favour of B. V, son of his sister Sibylla, and a child of 6 years old. He d. a few months after his uncle.

Baldwin, Evelyn Briggs (1862-1933), Amer. Arctic explorer, b. Springfield, Missouri. He accompanied Peary on the N. Greenland expedition as meteorologist, 1893-4, and acted in a similar capacity as second in command of Walter Wellman's polar expedition to Zemlya Frantsa-Josifa, 1898-9. He discovered and explored Ostrov Greem-Bell (Graham Bell Island), 1899, and organised the B.-Ziegler polar expedition, 1901-2. He built and named Fort McKinley. He pub. sev. meteorological reports, and wrote *Search for the North Pole, Frans Josef Land, and North Greenland Expedition*.

Baldwin, James Mark (1861-1934), Amer. psychologist, b. Columbia, S. Carolina, and educ. at Princeton. He studied psychology at Leipzig under W. Wundt (q.v.). While holding a teaching post at Toronto he founded the first experimental psychology laboratory there, and later another at Princeton Univ. Eventually he turned to the study of evolution, genetics, and sociology. He lectured at Oxford (1915-16) and in France (1915), where, at the Ecole des Hautes Etudes, he was appointed lecturer (1918) and prof. (1919). His pub. include *Handbook of Psychology* (2 vols.), 1888, *Social and Ethical Interpretations* (4th ed.), 1907, *Mental Development of the Child and the Race* (3rd ed.), 1907, *Darwin and the Humanities*, 1909, *The Individual and Society*, 1910, *History of Psychology*, 1913, and *Genetic Theory of Reality*, 1915. See his *Psychology in Autobiography*, ed. C. Murchison, 1930.

Baldwin of Bewdley, Stanley, 1st Earl (1867-1947), statesman, b. Bewdley, Worcs, the son of a wealthy manufacturer. B. was educ. at Harrow, and at Trinity College, Cambridge. At one period he had thoughts of becoming

an Anglican clergyman; but he joined his father as partner when he came of age, and for 20 years devoted himself to the business. On his father's death B., who had in 1906 unsuccessfully contested Kidderminster for the Conservatives, succeeded his father to the seat in Parliament—later called the Bewdley div.—which he kept until he received a peerage. When the second Coalition Gov. was formed under Lloyd George, Bonar Law became chancellor of the exchequer, and B. was appointed his parl. private secretary in Jan. 1917. A few months later



Topical Press

EARL BALDWIN

he was financial secretary to the Treasury. From April 1921 he was president of the Board of Trade. As the time for a general election approached in 1922, B. became dissatisfied with the Coalition, and his speech at a party meeting in Oct., condemning the Coalition, played a great part in the fall of Lloyd George's gov. The election gave the Conservatives a clear majority; and the Bonar Law gov., already formed, met Parliament with B. as chancellor of the exchequer. His most prominent action while in this office was his visit to Washington in Jan. 1923 with Mr (later Lord) Norman—the Governor of the Bank of England—to settle the funding of the debt of \$978,000,000 to the U.S.A.

In May 1923 Bonar Law retired through ill health, and B.—who, 6 months before, had been hardly known to the greater part of the public—became Prime Minister at the age of 56. During the early months of his first premiership B. attained to an almost unprecedented position of authority as the leader and

spokesman of the nation. But at a general election held in Dec. the Conservatives lost their clear majority; B. was defeated in the Commons 21 Jan. 1924, and resigned next day. The Labour Gov. that followed fell on 8 Oct. over the Campbell prosecution question: B.'s management secured their defeat. Then followed the 'Zinoviev' election: the Conservatives came back with a large majority, and B. was premier once again. The main problem of his premiership on this occasion was the serious general strike (q.v.) of May 1926—the foremost figure in gov. action being not the Prime Minister but Churchill. The same year B. paid a visit to Canada. In 1929 B. went to the country on an extension-of-safeguarding programme; and at the general election of 30 May his party sustained a heavy defeat, and he resigned—the Labour party taking office again, though without a clear majority. He was elected rector of St Andrews Univ., May 1930. In 1931 he took office as lord president of the Council in the National Gov. formed by Ramsay MacDonald. In July 1932 he headed the Brit. Gov.'s delegation to the Imperial Economic Conference in Ottawa.

On MacDonald's resignation in 1935, B. took his place as Prime Minister. In his Indian policy he was taunted by Churchill with splitting the Tory party, but he pursued his course and secured sufficient support for a Bill framed on the general lines of the Joint Committee's Report (see INDIA, *History*). The Bill (Government of India Bill, 1935) received the Royal Assent on 22 Aug. 1935, and B. had again triumphed, for the Tory party had escaped a split and the National Gov. was prepared to make a united appeal for a new vote of confidence. But B.'s personal triumph was short-lived, for within a month thereafter the Hoare-Laval Pact for settling the Abyssinian war by the cession of Ethiopian ter. to Italy was concluded in Paris, and the swift reaction of Brit. public opinion inflicted upon B. the greatest humiliation of his career, the pact being regarded as a betrayal of the League of Nations. B. immediately declared the proposals in the pact 'absolutely and completely dead.' At the general election in 1935 B. had been returned with a majority of nearly 250. At about this time B. began to stress the increasing menace of air attack and so to prepare the nation for a policy of rearmament. But he did so with little sense of urgency, and with insufficient emphasis. A more daring leader would have attempted to lead public opinion more positively in this vital matter: but B. was not of this calibre. It fell to him, in the midst of preoccupations with grave international problems, to advise King Edward VIII on the constitutional position arising out of his proposed marriage. In the event King Edward abdicated (Dec. 1936). B.'s Cabinet took the precaution of drafting a Bill cited as 'His Majesty's Declaration of Abdication Bill,' and it was B. who laid the measure before Parliament. Towards

the Sp. Civil War B. pursued a policy of non-intervention. B. retired from an active part in politics in 1937, being granted an earldom in the same year. He retired, a highly popular and respected figure: when he d. 10 years later he became the target for exaggerated criticism for his conduct 1935-7, Britain's unpreparedness for war in 1939 being often blamed on him alone. Posterity will be more just: at the time B. undoubtedly had the majority of his countrymen behind him. He can, however, be condemned morally for shrinking from positive actions which facts at his disposal must have made him know were right, but which would have earned him at least temporary unpopularity. Perhaps his chief title to enduring fame is that he could impose his character upon the mind of Parliament and the nation for as long as 14 years. He had sweetness of temper and magnanimity, but was prone to inexcusable inertia and only too conscious of his indolence. See lives by Wickham Steed, 1930; A. Bryant, 1937; G. M. Young, 1952.

Baldwin, William (fl. 1547-60), Brit. poet. Educ. at Oxford, he was printer, clergyman, and schoolmaster. He ed. the first ed. of *A Mirror for Magistrates*, 1559, to which he contributed. His separate works include *Canticles or Ballads of Solomon*, 1549, and a popular prose *Treatise of Moral Philosophy*, 1547.

Bale, John (1495-1563), prelate and author, b. Cove in Suffolk. Educ. at Jesus College, Cambridge, in 1529 he became prior of the Carmelites of Ipswich. Soon after this date he adopted the principles of Protestantism, and wrote in its defence. In consequence Edward VI made him Bishop of Ossory, 1552, but on the accession of Mary he was forced to escape, first to Holland and then to Switzerland. On his return to England he was made a prebendary of Canterbury by Queen Elizabeth. He d. at Canterbury, and was buried in the cathedral. His fame rests on his contributions to early Eng. drama, notably *King John*, which is a link between the morality plays and Elizabethan historical drama. He also wrote a Lat. *Account of the Lives of Eminent Writers of Great Britain*, 1548, and one or two autobiographical pieces. His select works were pub. by the Parker Society, 1849.

Bâle (Switzerland), see BASEL.

Bale, package or certain quantity of goods or merchandise, packed up in cloth and tightly corded or hooped and marked and numbered so as to correspond with the marks and numbers in bills of lading for identification purposes. Specifically a bale of cotton, weighing 500 lb. (Amer. cotton) or 700 lb. (Egyptian cotton), and other fixed weights for various other commodities.

Balearic Isles (Sp. *Islas Baleares*), group of is. lying off the E. coast of Spain in the Mediterranean, the prin. of which are Majorca, Minorca, Ibiza, Formentera, and Cabrera (qq.v.). They form a Sp. prov., the cap. of which is Palma (q.v.). The is. were held successively by the Greeks,

Carthaginians, Romans, Vandals, and Moors. The inhab. had a reputation for their skill in war as slingers. The is. were taken from the Moors in the 13th cent., and were finally incorporated with Aragón (q.v.) in 1349. Minorca was in Brit. hands for most of the 18th cent. The climate of the is. is generally temperate; cereals, wine, fruit, and oil are produced, and there are anchovy and sardine fisheries. Area 1936 sq. m.; pop. 425,900. See F. Chamberlin, *The Balearics and their Peoples*, 1927.

Balechou, Jean Jacques (1715-64), Fr. engraver. His works are still valued and sought for by collectors.

Balen, Hendrik van (1560-1632), Flem. historical painter, and the first master of Van Dyck and Snyders, b. Antwerp. He studied under Adam van Noort, and later at Rome.

Balestra, Antonio (1666-1734 or 40), It. painter, b. Verona. He was brought up as a merchant, but before his twenty-first year he was studying painting under Bellucci at Venice. He afterwards studied under Maratta at Rome, and combined the chief beauties of Venetian colour with the characteristic correctness and solidity of design of the Rom. school. He is regarded as one of the most able painters of his time.

Balfé, Michael William (1808-70), Irish singer and composer, b. in Dublin, and early showed great talent, acting as leader of the Drury Lane orchestra in 1824, when only 16. After a career as operatic singer and composer in Italy (1825-33) he began to compose Eng. operas, of which he wrote 19, besides 3 more in Italian and 3 in French. *The Siege of Rochelle*, 1835, ran for 8 months, but it was his *Bohemian Girl*, produced in 1843, that brought him prominently before the public. In 1845 he was appointed conductor of the It. Opera, Covent Garden, and in 1857 produced *The Rose of Castile*. He was fashionable on the Continent as far as Russia and at his best could rival Donizetti or Auber. Unfortunately his Eng. librettos are exceedingly feeble.

Balfour, Alexander Hugh Bruce, Lord Balfour of Burleigh (1849-1921), Scottish nobleman, b. Kennet, Alloa, and was educ. at Loretto, Eton, and Oriel College, Oxford. He was created 6th Baron B. of Burleigh in 1869. The title had originally been bestowed upon his ancestor Sir James B., in 1607, but the 5th baron having been implicated in the Jacobite rising of 1715, the title was attained. He was a Conservative, and was secretary for Scotland, with a seat in the Cabinet, from 1895 to 1903, resigning because of his opposition to tariff reform. He took an active and useful part in political, educational, and social reform movements.

Balfour, Arthur James, 1st Earl (1848-1930), statesman, b. Whittinghame, E. Lothian, and educ. at Eton and Trinity College, Cambridge. In 1874 he commenced his long political career by being returned as the member for Hertford in the Conservative interest; this constituency he continued to represent until

1885, when he was returned for E. Manchester. In 1878 he became private secretary to his uncle, the Marquess of Salisbury, who, on the resignation of Lord Derby, had become foreign secretary. In his capacity as private secretary B. accompanied Lords Beaconsfield and Salisbury to the Berlin congress, where he received his first lesson in international politics in the settlement of the affairs of Russia and Turkey. In 1880, on the accession to power of the Liberal Gov., he became a member of the Fourth party (q.v.), but took no very active part in its affairs. With the beginning of Lord Salisbury's first administration B.'s active official career began. In 1885 he became president of the Local Gov. Board. The second Salisbury administration, formed in the July of 1886, saw B.'s appointment to the chief secretaryship of Scotland and a seat in the Cabinet. In 1887 he became chief secretary for Ireland. This was B.'s first great appointment, and by the work which he did there, by the firmness with which he suppressed crime, by the tenacity with which he clung to his policy, he made himself the most prominent of Conservative statesmen, the most loved and respected by his adherents, the most hated but at the same time the most respected by his opponents, the Nationalists.

His work covers one of the most vital periods of Irish hist., and in the face of open outrage, in the face of threats and insults, B. proceeded with his work, which consisted of the pacification and good gov. of Ireland. The real success of his policy is doubtful, however: he did reduce crime enormously in Ireland, but the criticism that he turned Ireland into an armed camp cannot be altogether denied. That he was helped by events is also true; the Parnell Commission, followed by the O'Shea divorce case, which led to the downfall of Parnell and the break up of the Irish party, must have helped him considerably. In 1891, on the death of W. H. Smith, he became first lord of the Treasury and leader of the House of Commons. During his first tenure of this post he introduced a local gov. Bill for Ireland, which was withdrawn just before the dissolution of 1892, a dissolution which led to the downfall of the Unionist party and the accession to power of the Liberals. On the defeat of the Liberal party in 1895 he again became first lord of the Treasury and leader of the House of Commons in the administration of Lord Salisbury. During the early days of this second period of leadership B.'s attitude on the education questions called forth criticism not only from the opposition but from his own party as well, and this feeling was accentuated by his suggested scheme for a Rom. Catholic univ. for Ireland. His conduct of foreign affairs during the absence and illness of the Premier, Lord Salisbury, however, added very considerably to his reputation.

In July 1902 Lord Salisbury resigned and B. succeeded him as Premier. The administration which followed is remembered chiefly by the fiscal questions which

came to the front during that period. The Conservative Cabinet, surprised by the sudden proposals of Joseph Chamberlain, divided itself into 2 camps. Many resignations took place, but B. retained his position as Premier, and declared himself in favour of a retaliatory tariff. By-election after by-election went against the ministry, and in Nov. 1905 the gov. resigned, a gov. being formed by Campbell-Bannermann. The general election which followed brought about the complete downfall of the Unionist party, B. himself being defeated in E. Manchester, a seat he had held for 20 years. A safe seat was found for him in the City of London. Up to 1911 B. led the opposition in the House of Commons: on the question of the Veto Bill B. sided with Lord Lansdowne, and found himself opposed by a considerable and influential section of his party. In 1911 he resigned his leadership of the party, saying that his health forbade his further continuance in so arduous a post. However, he did not give up his seat, but, until the outbreak of war in 1914, he lived in comparative retirement, although speaking strongly, both in and out of Parliament, against Home Rule for Ireland and disestablishment of the Church in Wales. He devoted some of his new-found leisure to giving addresses on literature and philosophic subjects.

On the formation, in 1915, of the first Coalition Cabinet, he became first lord of the Admiralty. When Lloyd George succeeded Asquith as Prime Minister, B. accepted the foreign secretaryship, an office in which he had had some experience and had thus shared in the recent foreign policy. No sooner had he assumed this office than Germany instituted the unrestricted submarine campaign which brought the U.S.A. into the war. The result of this was that B. left England for America, in April 1917, as head of the Brit. mission which went to arrange co-operation with that country. His visit was a triumph, and he received the compliment of being asked to address the House of Representatives. B. was also one of the 4 members of the War Cabinet.

In the business of making the peace after the First World War he was the second Brit. representative at the conference which assembled in Paris in Jan. 1919. Shortly after the Peace of Versailles was signed he left the Foreign Office and became Lord President of the Council, in 1919. About this time he was elected chancellor of the univ. of Cambridge. He did not again hold Cabinet office. In February 1920 he presided at the first meeting of the council of the League of Nations and remained the Brit. representative of the League until he retired from office in Oct. 1922. In July 1921 he had accepted the invitation of President Harding to an international conference to be held at Washington, to deal with the limitations of armaments and to discuss Far E. and Pacific problems. Here he endorsed the bold proposals of Secretary Charles Hughes for the reduction of armaments and was largely

responsible for the contribution made towards international peace. See WASHINGTON, TREATIES OF (4).

He visited Palestine in 1925 to open the univ. of Jerusalem. He had been associated with the gov. policy on Palestine enunciated in 1917 (see BALFOUR DECLARATION). On his return he became Lord President of the Council in Baldwin's second ministry, and took charge of the Civil Research Committee. B. attained no less a rank as a philosopher than as a statesman. In 1904 he had become president of the Brit. Association at Cambridge. He was raised to the peerage in 1922. Amongst his varied publs. are *A Defence of a Philosophic Doubt*, 1879, *Essays and Addresses*, 1893, *The Foundations of Belief*, 1895, *Economic Notes on Insular Free Trade*, 1903, *Questionings on Criticism and Beauty*, 1909, *Theism and Humanism*, 1915, and *Theism and Thought*, 1923. See E. T. Raymond, *Mr Balfour: a Biography*, 1920, and B. E. C. Dugdale, *Arthur James Balfour, First Earl of Balfour* (2 vols.), 1936-40.

Balfour, Francis Maitland (1851-82), biologist, younger brother of Earl B. b. Edinburgh, educ. at Harrow and Trinity College, Cambridge, where in 1870 he was elected natural science scholar. Animal morphology next claimed his attention, and he succeeded in obtaining one of the two seats allocated to Cambridge at the zoological station at Naples. He had been impressed by the work of Sir Michael Foster in comparative embryology, and in 1880 pub. the first vol. of a treatise on that subject, following it with a second in 1881. The first of these vols. dealt with the embryology of the invertebrata, the second with that of the vertebrata. B. was resolute in refusing all offers of professorships from other univs., and continued to reside at Cambridge, which at length recognised his singlemindedness and ability by the institution of a special chair of animal morphology, of which he was appointed first prof. His health, never robust, was undermined by typhoid fever. On his convalescence he visited Switzerland, and whilst there he essayed the ascent of the Aiguille Blanche, Mont Blanc, which at that time had not been attempted. In this effort he lost his life.

Balfour, George John Gordon Bruce, Baron Balfour of Burleigh (1883-), succeeded his father as 7th baron in 1921. During the First World War he served with distinction in France.

Balfour, Gerald William, 2nd Earl (1853-1945), politician, younger brother of 1st earl, to whose title he succeeded in 1930. He was educ. at Eton and Trinity College, Cambridge. In 1885 he was returned to the House of Commons as Conservative member for Central Leeds. He was chief secretary for Ireland, 1895-1900; president of Board of Trade, 1900-5; president of Local Gov. Board, 1905-6. He was instrumental in introducing an Irish Local Gov. Bill which did much to conciliate the Home Rule party and which estab. co. councils and dist.

councils, one half of the expenditure of those bodies being met from the imperial exchequer. On his defeat at Leeds in 1906 he retired from politics.

Balfour, Sir Isaac Bayley (1853-1922), botanist, b. Edinburgh. He was regius prof. of botany at Glasgow, 1879-84; Sherardian prof. of botany at Oxford and fellow of Magdalen College, 1884-8. In 1888 he accepted a similar chair at the univ. of Edinburgh, and was regius keeper of the Royal Botanic Garden in that city from 1888 until his death in 1922. For the same period he was king's botanist in Scotland. In 1880 he explored the is. of Socotra, in the Indian Ocean, and in 1888 pub. his findings in the *Transactions*, vol. xxxi, of the Royal Society, Edinburgh. He also ed. *The Annals of Botany* from 1887.

Balfour, Jabez Spencer (1849-1916), Brit. financier and politician, who became notorious as the chief promoter of the Liberator Building Society, 1868, and of similar speculative ventures, which failed in 1892 with liabilities amounting to over £8,000,000. B. fled to the Argentine, but was extradited to England and sentenced, in 1895, to 14 years' penal servitude. He was released in 1906. Between 1880 and 1893 he sat as Liberal M.P. for Tamworth and Burnley.

Balfour, James (1702-95), Scottish philosopher, b. Pilrig in the shire of Midlothian, was admitted an advocate of the Scottish Bar in 1730. He early became an opponent of Hume, whose speculations he attacked in two anonymous treatises, the one entitled *A Delineation of Morality*, the other *Philosophical Dissertations*. In 1754 he resigned his judicial office, having been elected to the chair of moral philosophy at Edinburgh. This he resigned in May 1764 for the chair of public law, and afterwards he pub. his lectures under the title of *Philosophical Essays*. In 1779 he resigned the chair of public law, and retired to Pilrig, where he d.

Balfour, Sir James, of Denmyne and Kinnaird (c. 1600-57), Scottish historian. He studied heraldry at the College of Heralds in London, and later wrote the *Monasticon Scoticum*, a collection of Scottish eccles. charters. In 1630 he was created Lyon king-of-arms, and in 1633 was made a baronet. He was deprived by Cromwell of his office, and thereafter devoted himself to the collection of heraldic antiquities, and wrote sev. abridgments of Scottish charters and chronicles, notably the *Annals of the History of Scotland from Malcolm III to Charles II* (pub. 1837).

Balfour, Sir James, of Pittendreich (d. 1584), Scottish lawyer. He was implicated in the murder of Cardinal Beaton, and in 1547 he was sent with other conspirators to the Fr. galleys, whence he escaped in 1550. When he returned to Scotland his lack of Protestant zeal angered Knox. He was created a lord of session or judge by Queen Mary in 1563. In 1567 he was appointed Governor of Edinburgh Castle, and, having assisted the enemies of the queen, was after her dethronement made president of the court

of session. He was forced to retire to France because of a charge brought against him of drawing up the bond for Darnley's murder, but later returned. He compiled *Practicks of Scots Law*, a handbook of the Scottish legal system.

Balfour, John Blair, see KINROSS OF GLASCLUNE, BARON.

Balfour, John Hutton (1808-84), botanist, b. Edinburgh and graduated at the Univ. of his native city. He took his M.D. degree in 1831; prof. of botany in Glasgow, 1841, Edinburgh 1845. He was also appointed keeper of the Royal Botanic Gardens, where he had been preceded by Hope, Roxburgh, and Buchanan. This dept. of his work brought him recognition from botanists all over the world. He was dean of the faculty of medicine in Edinburgh for 30 years, ultimately retiring from his various appointments in 1879.

Balfour Declaration, see PALESTINE and ZIONISM.

Balfrush, or Barfurush, see BABOL.

Balgonie, Lord, see LESLIE, ALEXANDER.

Balguy, John (1686-1748), theologian, b. Sheffield. He was educ. at Cambridge, and in 1718 pub. 2 pamphlets in defence of Bishop Hoadley. In other works he defended Dr Clarke and his views against such antagonists as Tindal and Shaftesbury. He wrote an *Essay on Redemption*, 1741, which exhibited considerable broad-mindedness for his time, and for his services, personal and otherwise, was appointed a prebendary of Salisbury in 1727 by Hoadley.

Balguy, Thomas (1716-85), Eng. divine of the Latitudinarian school, educ. at Ripon Free School and St John's College, Cambridge, where he held the Platt Fellowship, 1741-8, and was assistant tutor to Dr Powell, lecturing on moral philosophy for 16 years. Among the various positions he held at different times were those of public orator, tutor to the Duke of Northumberland, rector of North Stoke, prebendary of Winchester, archdeacon of Salisbury, archdeacon of Winchester, and vicar of Alton. He pub. many discourses, sermons, essays, and a life of his father, John B.

Bali, or Little Java, is. of Lesser Sundas, Indonesia, situated E. of Java, separated by B. Strait, and W. of Lombok across Lombok Strait. Of volcanic origin it has a mountainous interior (Mt Agung, 10,308 ft) with a large plain in the S. Agric. products include copra, rice, coffee, tobacco, and teak from the forests; and live-stock is reared. It is an important handicraft centre for wood, metal, and weaving. Moderate climate and light rainfall except during the monsoon. B. is very important culturally and economically to Indonesia. Dutch trade began in the early 17th cent., but Dutch rule was not firmly estab. until 1908. Occupied by Japanese in the Second World War, B. became part of Indonesia, 1950. Pop. over 1 million, of Hindu-Javanese extraction; religion Hindu.

Balikesir, or Balakhisar, or Balikliari, fl and tn of Asiatic Turkey. Situated in a fertile basin, the chief products are

opium, silk, and cereals. Pop. (11) 563,000; (tn) 36,000.

Balin and Balan, 2 brothers in the Arthurian legend. They met on their wanderings, and, failing to recognise each other, fought, and both were slain. Consult Malory, *Morte d'Arthur*. There is also an early poem called *Balan*, belonging to the Charlemagne cycle, the Eng. version of which is *The Soucdone of Babyllone*.

Balingen, Ger. tn in the Land of Baden-Württemberg (q.v.), in the Eyach valley, 38 m. SSW. of Stuttgart (q.v.). It is a holiday resort, and has an 11th- and a 15th-cent. church. Pop. 8700.

Balliol, Family of. The B. family was founded by *Bernard de B.*, who came from Barnard Castle, and was a courtier of David I of Scotland. It was of Norman origin, and shared in the prosperity and prestige which the Normans attained in Scotland in the 12th cent. In the dispute concerning the heirship of the crown of Scotland on the death of the Maid of Norway (1290) *John de B.* (1249-1315) claimed the crown as grandson of Margaret, the eldest daughter of David, Earl of Huntingdon, brother of William the Lion. After the commissioners of Edward I of England had heard the rival claimants, the chief of whom was Robert Bruce, grandfather of the famous monarch of the same name, their award was given to John de B., who assumed the crown of Scotland as vassal of Edward (1292). From the first he was unpopular with the Scots, who dubbed him the Toom Tabard, or empty garment. In 1296 he revolted from his vassalage, giving as his reason for so doing the wanton outrages which Edward committed upon his subjects. The Scots made an inroad into Tynedale, but were defeated with considerable loss at Dunbar (28 April 1296). B. was compelled to surrender his crown, after which he and his 3 sons were sent to London, where they were confined in the Tower for 3 years, and then released at the request of Pope Boniface. B. d. in France, at his patrimonial estate of Bailleul. *Edward* (d. 1363), his son, displayed some ambition, and he invaded Scotland in 1332, in the reign of David II of Scotland, defeating the Earl of Fife at Kinghorn. He again defeated the royal forces at Dupplin Moor, and took Perth. He was crowned at Scone in Sept., but the country rose against him, and he was routed at Moffat. After the defeat of the Scots at Halidon Hill, however, B. returned to Scotland, and attempted to dismember the kingdom by dividing it among the nobility. In 1335, deserted by the nobles, he fled to England and surrendered his claims to Edward III. He d. childless. *Henry*, his brother, had been slain at the battle of Moffat. *John B.*, father of the King of Scotland of the same name, founded Balliol College, about 1263.

Ballista, see BALLISTA.

Balistes, Trigger-fish, or File-fish, classified in the order Plectognath div. of the Teleostei, and generally known as

file-fishes from the serrated spines on their dorsal fins. A peculiarity of this spine is that it can be retracted by muscular action into a groove in the underlying osseous structure, and when erected can be fixed by interlocking with a spinal projection which can be depressed and raised at will. There are sev. species, of which one, *B. capricus*, is occasionally found off the coasts of Great Britain. File-fish is also the name given to a related genus *Monacanthus*.

Baliuag, tn of Luzon, Philippine Is. Rice is milled, and buri-palm hats are made. Pop. 30,870.

Belize, see BELIZE.

Balkan Mountains (anc't *Haemus*), branch or sub-range of the central European mt system, extending from the Iron Gates of the Danube to Cape Emin on the Black Sea. Most of the range, which is about 15 to 25 m. broad and 375 m. long, lies within Bulgaria (in Bulgarian it is called *Stara Planina*). The highest mt is Yumrukchal (7795 ft). The chief pass is the Shipka.

Balkan Peninsula, *The*, the most easterly of the 3 great peninsulas of S. Europe, running southward between the Aegean and Adriatic Seas. Its area is about 200,000 sq. m. The boundary of the peninsula is roughly a line drawn from the mouth of the Danube to the head waters of the Adriatic at Trieste. On the E. it is bounded by the Black Sea, the sea of Marmora, and the Aegean, on the S. by the Mediterranean, and on the W. by the Ionian and the Adriatic Seas. *See* ALBANIA; BOSNIA-HERCEGOVINA; BULGARIA; CROATIA; DALMATIA; GREECE; HUNGARY; MACEDONIA; MONTENEGRO; RUMANIA; SERBIA; SLOVENIA; TURKEY; YUGOSLAVIA.

History of the Balkan Peninsula during the Nineteenth and Twentieth Centuries. Up to the beginning of the 19th cent. the Turks were the dominant race in the B. P. The whole of the peninsula was under their sway except Dalmatia, Montenegro, and the Ionian Is. The cents. of Turkish rule had brought to the conquered races no desire to amalgamate with their conquerors, and no real assimilation of races had taken place, though large numbers of people had been converted to the Muslim faith, notably in Albania. In the third decade of the 19th cent. the war of Gk Independence resulted in an independence for Greece which was recognised by the Turks in 1829, and in 1830 the independence of Serbia as a tribute-paying principality was also recognised. The real break-up of the Ottoman empire began in 1875 with an insurrection in Hercegovina. Similar revolts in Bulgaria were crushed by the massacre of 12,000 Christians, an act which alienated Brit. sympathy and paved the way for the Russo-Turkish war (1877-8). By the treaty of San Stefano a large Bulgarian principality was created as a threat to Turkey, but England and Austria, both hostile to Russia, forced a revision of this treaty at Berlin in 1878. Bulgaria was cut down to a smaller state under the suzerainty of the sultan;

Serbia, Rumania, and Montenegro were now independent, while Bosnia and Hercegovina were put under Austrian administration. The new states had a respite of about 20 years in which to attend to internal development. Attempts to strengthen Bulgarian national unity led to trouble with Russia and Turkey; while suspicion between Serbia and Bulgaria was already almost traditional. To counteract the increasing strength of nationalism in the B. P., Turkish despotism was increasing under Abdul 'the Damned,' who was befriended by Germany. His reign was marred not only by the Armenian massacres, but also by the oppression of the Turks themselves. In 1909 the Young Turk party revolted, and a more constitutional gov. was set up under Abdul's brother, Mohammed V. But the Young Turks' foreign policy embroiled them in a war with Italy over Tripoli, and their oppression in Albania and Macedonia precipitated the formation of the Balkan League in 1912.

The first Balkan war began in Oct., and the allies (Bulgaria, Serbia, Montenegro, and Greece) were victorious over Turkey. Then the 'allies' quarrelled over the partition of almost the whole of former Turkey-in-Europe, and the second Balkan war followed in June 1913. *See further* BALKAN WARS.

Germany was now maturing her scheme of a *Mittel-Europa*, a central empire from Hamburg to Constantinople. Ger. influence was already predominant in Turkey and Bulgaria, while Austria coveted the port of Salonika. At the outbreak of the First World War, Turkey, Greece, Rumania, and Bulgaria declared their neutrality. The aim of diplomacy was to bring these nations into the conflict on one side or the other. By Nov. England and Turkey were at war. The prestige of the Entente suffered by the failure to force the Dardanelles in the Gallipoli campaign of 1915. Bulgaria declared for Germany. The Gallipoli forces were diverted to Salonika, and from there operations were started to save Serbia from the Austrians and Bulgarians. These also failed, and Serbia was disabled in the autumn of 1915. In 1916 Rumania declared war on Austria, but was decisively defeated. The dreams of the pan-Ger. imperialists were now almost fulfilled.

In June 1917 Greece under Venizelos (q.v.) declared war on Germany, Turkey, and Bulgaria. A year later a general allied attack began with Salonika as base and Bulgaria was put out of the war. The various treaties at the end of the war caused the growth of Rumania and the union of the Serbs, Croats, and Slovenes into the kingdom of Yugoslavia. Not long after the war, however, there were three conflicts, first, between Italy and Yugoslavia over the Dalmatian seaboard and the occupation of Fiume (1919); then between Greece and Turkey over the Gk occupation of Smyrna (1922); and finally between Greece and Italy over a political murder, leading to the bombardment of Corfu (1923).

During the 12 years following the First World War, the B. P. states had a hist. of political instability, resulting in dictatorships of one sort or another being set up in all of them, though cloaked by the retention, in name at least, of parl. institutions. All were keenly aware of their external vulnerability.

In 1933 Bulgaria tried to form a S. Balkan bloc, consisting of Bulgaria, Greece, and Turkey, by way of political and economic counterpoise to the Little Entente. A Balkan pact, between Yugoslavia, Rumania, Turkey, and Greece, was, however, signed at Athens, 9 Feb. 1934, by which the signatories mutually guaranteed the security of all their Balkan frontiers; and also, not to embark on political action against any other Balkan non-signatory without previous mutual discussion, or to assume any political obligation towards any other Balkan state without mutual consent.

The movement for a Bulgar-Yugoslavian *rapprochement* was advanced by the signing of a non-aggression pact between those two countries in 1936, and there were also, in the same year, tentative efforts towards a Bulgarian *rapprochement* with the Balkan Entente (Greece, Rumania, Turkey, and Yugoslavia). In Feb. 1938 the permanent council of the Balkan Entente, meeting at Ankara under the presidency of Metaxas, the Gk Prime Minister, to consider the orientation of the Entente after the It. conquest of Abyssinia and the general tension in the Mediterranean owing to It. and Ger. interference in the Sp. Civil war, described their Mediterranean policy as one of good relations and co-operation with the Mediterranean powers, Great Britain, France, and Italy. By this time the general political situation in Europe had deteriorated, and swift diplomatic moves were made by Balkan countries to safeguard their position in the event of a general European war. A non-aggression pact between Bulgaria and the Balkan Entente was signed at Salonika on 31 July 1938. Under this treaty (besides the provisions on mutual non-aggression) the military and naval clauses of the treaty of Neuilly, 1919, were renounced, as also were those clauses in the Lausanne convention of 1923 respecting the Thracian frontier. The effect of this pact was that Bulgaria was thenceforward free to introduce military service and to complete her armaments without restrictions; and, further, she was at liberty to occupy with troops the Thracian frontier zone between Bulgaria, Greece, and Turkey, which had been demilitarised under the Lausanne treaty. The integrity of the three countries of the Balkan Entente—Greece, Rumania, and Turkey—was guaranteed by Great Britain and France in 1939 as a counter-move to the fear of Ger. penetration into SE. Europe. The most definitive of these guarantees was the mutual aid pact between Great Britain and Turkey concluded in May 1939; this was, in effect, a long-term agreement of a reciprocal character in the interests of their national security. For

the impact of the Second World War on the B. P. see EASTERN FRONT, or RUSSO-GERMAN CAMPAIGN IN SECOND WORLD WAR; also EUROPE, *History*; and GREECE, SECOND WORLD WAR CAMPAIGNS IN (1941).

After the Second World War it seemed for some time that the whole B. P. would come within the Soviet orbit; but Brit. military aid helped to prevent a communist revolution in Greece, and from mid 1948 Yugoslavia acted independently of the Soviet Union in foreign affairs. Rumania, Bulgaria, and Albania remain (1956) firmly linked to the Soviet bloc, being members of the Warsaw pact; in 1953, however, Yugoslavia, Greece, and Turkey signed a treaty of friendship which, though vague in terms, promised a new era of co-operation between these countries of the B. P. which had a common hist. of disagreement. Greece and Turkey were already members of N.A.T.O. (q.v.). From 1954 onwards, however, this Balkan link with N.A.T.O. was progressively weakened by Græco-Turkish bitterness arising out of the Cyprus dispute, and at the beginning of 1957 Western influence in the B. P. was in general at a low ebb.

BIBLIOGRAPHY: *The Present Condition of the Balkans and of European Responsibilities*, by various writers, ed. by Luigi Villari, 1905, has historical value. Other useful works on this earlier period or before are *Turkey in Europe*, by 'Odysseus,' 1900, and W. Miller, *The Balkans*, 1909. Works on the period immediately preceding and on that since the First World War include N. Forbes, A. Toynbee, and others, *The Balkans*, 1913, W. S. Murray, *The Making of the Balkan States*, 1912, J. A. R. Marriott, *The Eastern Question*, 1924, W. Miller, *The Ottoman Empire and its Successors* (3rd ed.), 1927, G. E. R. Gedyes, *Heirs to the Hapsburgs*, 1932, J. S. Roucek, *Politics of the Balkans*, 1939, B. Newman, *Balkan Background*, 1944, and C. Wilmot, *The Struggle for Europe*, 1952. See also bibliographies under individual Balkan nations.

Balkan Wars, The (1912-13). The epoch of European hist. brought to a close by these wars was that which opened in 1453 with the fall of Constantinople, cap. of the Byzantine empire, which, together with the whole Balkan Peninsula, was submerged beneath the wave of Turkish invasion from Asia Minor. In the cents. which followed it was only gradually that one by one the Balkan races achieved partial or complete autonomy. The decline of Ottoman power in the 19th cent. was slowed down by the jealousies of the great powers of Europe and by the rivalries of the petty Balkan states themselves. The Crimean war (1854-6), between Russia on the one hand and England and France on the other, was undertaken by the latter powers to maintain Turkish rule in Europe, and in 1885 Bulgaria and Serbia, for a brief period, were at war with one another because the latter country feared a territorial aggrandisement by Bulgaria in E. Rumelia. The sultan, Abdul-Hamid II, benefited from these jealousies,

and thus for many years secured an immunity, during which he continued to oppress his European provs. But his misgovernment and despotism were too much even for his Muslim subjects. He was deposed in 1909, and a more constitutional regime inaugurated, with his brother, Mohammed V, as sultan.

The hopes raised by the successful revolution of the Young Turks that the Christian pop. of Turkey-in-Europe would be better treated proved to be illusory. So far as the Turks themselves were concerned, some reforms were effected. Jews and Christians were indeed allowed to become officers in the army, but the non-Islamic pop. as a whole (which in Turkey-in-Europe numbered about three-fifths of the total pop.) was no better off. The small states who were Turkey's neighbours in the Balkan Peninsula unavailingly protested against the oppression of their kinsmen in Albania, Macedonia, and Thrace. They appealed to the great powers, who formed the so-called Concert of Europe, to fulfil the obligation to which they had pledged themselves by the treaty of Berlin in 1878, but with little result. At last, despairing of anything being done by the powers, the Balkan states decided to settle the problem themselves by military action. Greece had already, in 1897, fared badly in a war with Turkey. But what each state was individually too weak to accomplish might be effected by union. Sinking for a while their differences, Bulgaria, Serbia, Greece, and Montenegro combined (1912) to form the Balkan League, a league having for its object the safeguarding of the common interests of its nationals in the Turkish empire. By this means a striking force was formed of approximately the same strength as the Ottoman troops, with the added advantage of being able to attack on all sides at once. A suitable opportunity to strike presented itself towards the end of Sept. 1912. The Ottoman administration was suffering from the strain of a year-old war with Italy, and an Albanian rising. After the Balkan mobilisations the great powers, hastily seeking some formula which would preserve an artificial *status quo* in the Balkans, invoked the almost forgotten clause xxiii of the treaty of Berlin—an article by which the great powers pledged themselves to compel Turkey to introduce reforms into its European provs. But on 8 Oct. the smallest of the Balkan states, Montenegro, without even an ultimatum, declared war on Turkey. On 10 Oct. the great powers by their collective note made a last attempt to induce Turkey to grant such reforms as would avert war, and three days later an identical Graeco-Serbo-Bulgarian note was presented to the Ottoman Gov. Turkey's reply to the latter was to declare war on the Balkan allies on 17 Oct. In the meantime the Montenegrins had invaded Albania. Before Turkey declared war on the allies two other significant events had taken place: the admission of deputies from Crete into the Gk Chamber on 14 Oct., and the conclusion on 15 Oct. of

the Peace of Ouchy (or Lausanne) between Turkey and Italy, a peace in which Turkey recognised the *fait accompli* of its occupation of Tripoli.

The Serbs and Greeks invaded Macedonia, the Bulgarians entered N. Thrace. Each of the invading armies overcame Turkish resistance in various parts of the country. The Bulgarians on 22 to 24 Oct. at Kirk-Killise turned the right flank of the army under Nazim Pasha, the Turkish commander-in-chief. The Turks fled from Kirk-Killise, abandoning in their flight large quantities of stores and guns. By this turning movement the Turkish forces were divided: some were driven S. towards the Aegean Sea; the main body retreated towards Constantinople (now Istanbul), while the remainder speedily found themselves invested in Adrianople (Edirne). Pursued by the Bulgarians, Nazim nevertheless succeeded in rallying his forces, and a stand was made in an engagement extending over a front of 100 m. In this great battle, known as that of Bunar Hisse-Lule-Burgas, which was fought on 28-31 Oct., the Turks gained some early successes; but later they were compelled to fall back to Chatalja, with heavy loss. Subsequent Bulgarian attempts to storm Chatalja failed, however.

Meanwhile the Serbian forces were marching on Uskub, the cap. of Old Serbia. At Kumanovo the Serbs won a great victory on 23-4 Oct. The losses on both sides were heavy, the Turkish casualties being estimated at 5000. On 26 Oct. Uskub was occupied by the Serbian troops, and a few days later (2 Nov.) King Peter made his triumphal entry. In a short time the Serbian troops had swept over Macedonia, and a detachment was sent to occupy ports on the Adriatic. Monastir surrendered on 18 Nov. and Alessio, on the Adriatic, was occupied two days later.

The Gk army, under the crown prince, Constantine, was equally successful. Advancing through Thessaly, a few minor engagements were fought with a numerically weaker Turkish force, which retreated towards Salonika. The Turks were badly beaten at Yenidje near the Vardar on 1-2 Nov. The Greeks crossed this riv., and on 9 Nov. Salonika, then the second city of Turkey-in-Europe, surrendered without further fighting.

A notable feature of this war was the presence in the field of all the sovereigns of the allied states, Ferdinand of Bulgaria, Peter of Serbia, George of Greece, and Nicholas of Montenegro. From the military viewpoint the war demonstrated the usefulness of aeroplanes (of which Bulgaria had sev.), and showed that the bayonet was still a most effective weapon, especially in a final assault after artillery preparation.

Naval operations were of minor importance. Three only of the combatants possessed any fighting ships—Greece, Bulgaria, and Turkey. The Turkish fleet at that time was negligible, but it served to establish a blockade of the Bulgarian coast in the Black Sea, and it

bombarded a few coast tns, notably Varna. On the other hand, the Gk Navy occupied the is. of the Aegean Archipelago, beginning with Lemnos on 21 Oct., and finishing with Mitylene, 22 Nov. On 12 Nov. Turkey asked Bulgaria for an armistice. On 25 Nov. delegates met at Chataltja to arrange terms for this armistice, and the eventual peace. The armistice was signed on 3 Dec. by Turkey and all the allies except Greece, who maintained that the terms were too favourable to Turkey.

It is estimated that during the first weeks of the war the Turks lost from all causes 200,000 men. The allies captured 500 guns, 100,000 rifles, and vast quantities of stores and ammunition. The total casualties of the Balkan League are put at 80,000.

In the peace negotiations in London the issue was narrowed to the question whether Turkey was willing to surrender the Aegean is. and all her European possessions W. of Adrianople. Turkish agreement to this was finally secured, but before the settlement could be carried out Kiamil's gov. was overthrown on 23 Jan. 1913 by the Young Turk party, led by Talaat Bey and the popular Enver Bey (see ENVER PASHA). Kiamil resigned, and the Young Turks set up Mahmud Shevket Pasha as grand vizier. The new ministry made the retention of Adrianople a cardinal point of policy. The conference of London broke up and hostilities were resumed. During Mar. and April the 3 centres of Turkish power in the Balkans, the garrison tns of Adrianople, Janina, and Scutari, surrendered to the Bulgarians, the Greeks, and the Serbs respectively. On 30 May the Turks were compelled to sign the treaty of London. In this treaty the great powers of Europe had a guiding hand, and reserved to themselves the right to settle the boundaries of Albania and to determine the destiny of the Aegean Is. Turkey-in-Europe was confined to a piece of E. Thrace, within a boundary line drawn from Enos to Midia. The Balkan allies had the task of partitioning the rest of Turkey's former possessions in Europe. The div. of Macedonia was at once a source of contention. Bulgaria especially was dissatisfied with her gains, and on 29 June 1913 the Bulgarian army made a treacherous surprise attack along the Gk and Serbian lines in Macedonia, starting what is generally known as the Second Balkan War. A month's fierce fighting followed between the Balkan allies, during which Turkey seized the opportunity to reoccupy Adrianople. Rumania advanced upon Bulgaria from the N. and occupied the ter. of Silistria. Bulgaria was forced to make peace, and on 10 Aug. 1913 the treaty of Bucharest was signed, thus bringing to an end the Second Balkan War. By its terms Bulgaria was excluded from Macedonia, and Adrianople reverted to the Turks. Rumania, Montenegro, Serbia, and Greece made large territorial gains. The two wars had caused the death of nearly 350,000 men, and caused a legacy of hatred among the

Balkan states which was to have repercussions over the next four decades. They had, however, succeeded in their original aim of breaking Turkish power in Europe.

Consult J. B. Schurman, *The Balkan Wars, 1912-13*, 1914; D. J. Cassavetti, *Hellas and the Balkan Wars, 1914*; R. Rank, *Inner History of the Balkan War, 1914*; R. W. Seton-Watson, *The Rise of Nationality in the Balkans, 1917*.

Balkars, Turkic-speaking people closely related to the Karachay (q.v.), who lived until 1943 on the N. slopes of the main Caucasian range, E. of El'brus, and numbered (1939) 43,000. They were subject to Kabarda (q.v.) from the 1820's to Russia, and were included in the Mountain Peoples' Autonomous Rep. in 1921, and in the Kabarda-Balkar Autonomous Oblast in 1922. In 1943 the B. were deported to Asiatic Russia for alleged collaboration with the Germans. They were rehabilitated in 1957. See W. Kolarz, *Russia and Her Colonies, 1952*.

Balkh, formerly cap. of a principality of that name in N. Afghanistan, and once known by its Persian name Bakhtri as the cap. of anct Bactria (q.v.). It is situated 23 m. S. of the R. Amu Dar'ya and the ruins of its anct site are still discernible, having a circumference of at least 20 m. Four m. to the eastward lies the new tn, called Mazari-i-Sherif, the modern Afghan cap. of the prov., with a pop. of about 30,000. It was here that the Graeco-Asiatic civilisation first found expression, but even before this the magi of Persia founded the Zoroastrian religion. On the death of Alexander the Great it became incorporated with the Graeco-Syrian kingdom of the Selucidae, and later figured as a centre where Buddhist propaganda was disseminated. The natives designated it Am-ul-Beled, mother of cities, and trusted in its rehabilitation to the condition of its anct splendour. The neighbouring soil is fertile, and large quantities of wheat are grown.

Balkhash: 1. Lake in the Karaganda and Taldy-Kurgan Oblasts of the Kazakh S.S.R. of the Soviet Union. It is 150 m. in length, with a breadth of half that distance, and is the fourth largest inland sea in the U.S.S.R. For 6 months in the year, from Nov. onwards, it is frozen over. During the rest of the year it is open to water-borne traffic, and shipyards have been put in operation at the mouths of the Karatal, Lepsa, and Ili R.s, which are the chief rivs. feeding the lake.

2. A tn situated on Lake B. An important centre of the copper industry. Pop. 60,000.

Ball, Games of. Originally the game of B. had probably a religious significance, and some of the pastimes into which the use of the B. or sphere enter, such as the B. game of certain Amer. Indian tribes, or that of the anct Mexicans, are known to have possessed an astronomical basis. Again, the struggle of good against evil is thought to have been typified by certain anct Persian B. games, the sphere in this instance representing the world. In Greece and Rome in classical times

various B. games were played by young and old, and in medieval England and France tennis and pell-mell were favourite pastimes. In more modern times first golf, native to either Holland or Scotland, then cricket were evolved as B. games, and football, perhaps the most popular of all, has been a game of both the Scottish and Eng. people for cents. Polo and baseball, the latter a game of Amer. origin, lawn tennis, lacrosse, and basket-ball are other modern B. games. See separate articles.

Ball, Albert (1896-1918), air-ace of First World War, b. Nottingham. An outstanding fighter pilot, he was awarded the V.C. posthumously in 1918 (having already won the D.S.O. and M.C.).

Ball, Sir Alexander John (1757-1809), Eng. admiral, served in the Mediterranean under Lord Nelson. In 1799 he was elected by the Maltese as their chief and the president of their congress. He became rear-admiral, 1805. Nelson thought him a 'great coxcomb' before B. received a command; but afterwards, when B. was continuously employed, they became close friends. B. served under Nelson at the battle of the Nile, where his ship *Alexander* was the particular opponent of Brueys's flagship *L'Orient*, which blew up. He proved a very popular governor of Malta, being solicitous for the interests of the Maltese.

Ball, John (d. 1381), Eng. priest and agitator who helped to stir up the mob during the Peasants' Revolt (q.v.). He had travelled the country for 20 years previously preaching doctrines which seem to have combined religious reform with ideas of social revolution. He was in prison in Maidstone when the revolt began, but was freed by the rebels and is said to have spurred them on to many excesses. On the collapse of the revolt and the death of Tyler he was captured and hanged at St Albans, 15 July 1381. See Wm Morris, *A Dream of John Ball*, 1888, and Sir C. Oman, *The Great Revolt of 1381*, 1906.

Ball, John (1818-89), Irish scientist, politician, and traveller. He was called to the Irish Bar, 1845; became M.P. for co. Carlow, 1852; under-secretary of state for the colonies, 1855-7; and first president of the Alpine Club, 1857. He pub. the *Alpine Guide*, 1863-8, ed. *Peaks, Passes, and Glaciers*, and wrote works on physical and geographical science.

Ball, Sir Robert Stawell (1840-1913), astronomer, b. Dublin; educ. at Trinity College. Lord Rosse appointed him his astronomer in 1865, and in 1873 he was elected F.R.S. and created prof. of applied mathematics in the Royal Irish College of Science. In 1874 he became prof. of astronomy at Dublin, with which went the office of Royal Astronomer of Ireland, and in 1892 became Lowndean prof. of mathematics at Cambridge. His best-known works are *The Story of the Heavens*, 1885, *In Starry Realms*, 1892, and *In the High Heavens*, 1893. D. at Cambridge.

Ball, Thomas (1819-1911), Amer. sculptor, b. Charlestown, Massachusetts. In early life he was a distinguished bass,

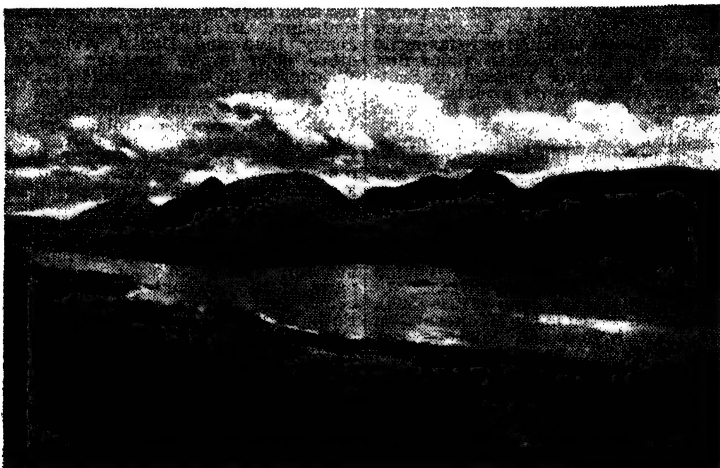
but soon gave up singing for painting and sculpture. In 1852 he made busts of Jenny Lind and Daniel Webster; his other chief works are the statue of Washington in Boston Public Garden, of Webster in the Central Park of New York, and the group 'Emancipation' in Washington. See his autobiography, *My Threescore Years and Ten*, 1891.

Ball Bearings, hard steel balls surrounding a shaft or axle, intended to lessen friction by substituting rolling for sliding contact. Where a fixed bearing is used, the journal, or portion of the shaft within the bearing, slides over the surface of the encircling material; such movement not only causes the wearing out of the parts in contact, but necessitates work being done to overcome the friction. Both of these disadvantages may be minimised by efficient lubrication, that is, providing a thin film of oil between the journal and the bearing. Theoretically, the resulting friction is reduced to the reluctance of the fluid to move over either surface; but practically it is impossible to maintain an absolutely continuous film of oil. For light loads and moderate speeds it has long been the custom to place a row of balls between hardened surfaces, called ball-races, on the rotating piece and the stationary piece. The balls roll over these surfaces if properly adjusted, and the only sliding friction which occurs is between ball and ball, and if the balls are of good shape and well lubricated, this is not considerable. The qualities of an efficient B. B. are therefore hardness in the balls and races, perfect sphericity and equality of diameter in all the balls, and a good lubricating arrangement. The races may be plane or concave, the best results being obtained where the races are curved to a radius of two-thirds of the balls' diameter.

Ball-flower, ornament in Eng. Gothic architecture, resembling a ball placed within a circular flower, sometimes with 3, sometimes with 4, petals. It is characteristic of the Decorated style of the 14th cent. It is supposed by some to be an imitation of a pomegranate, and by others of a hawk's bill.

Ballachulish, vil. and par. in Argyll, Scotland, on the S. banks of Loch Leven. The name is derived from Gaelic *Baile-aig-a-chaolas*, the vil. at the narrows or straits. The staple industry is slate-quarrying. Pop. 1500.

Ballad, poetical composition narrative in matter and lyrical in form which generally recounts some legend or story. It must not be confounded with the ballade (q.v.). This type of composition appears to have arisen spontaneously in almost all literatures, and represents one of the early stages in the evolution of poetic art. Its origin is much in dispute, but it seems to have begun, as its name implies (Lat. *ballare*, to dance) as a song intended to accompany a dance. Hence the term was applied to a spirited poem, and then to a poem in which a popular story was vividly and simply told. It originally received its present name and shape in Italy of the 12th cent. It is,



Valentine, Dundee

LOCH LEVEN AND THE GLENCOE MOUNTAINS FROM NORTH BALLACHULISH

however, in N. Europe that the B. has risen to highest distinction, and although the B.s of the Ger. poets Uhland, Bürger, Goethe, and Schiller certainly touch a level of the highest excellence as regards both composition and romantic feeling, it is to our own country we must look for the B. in its most natural form. The most perfect specimens of the Brit. B. are those early compositions to which no authorship can be assigned, although the works of Scott, Wordsworth, Tennyson, and Coleridge contain modern examples of this type of story-song.

What is true of folklore may be also held true of folk-song. The plots utilised in the B. are few and of world-wide acceptance. As the epic, folk-tale, fairy-tale, and *Märchen* are all universally wrought on the basis of a few venerable plots, so the material for the folk-song is almost equally scanty. These bases of the B. are among the romantic heritage of the sev. European peoples as much as is the story of the 'fatal children' common to all mythologies, or the tale of the neglected daughter, the origin of so much matter of faery. We have, too, the tale of the girl who follows her 'fause luve.' Such is the subject-matter of *Burd Ellen*, one of the most touching ever sung to the harps of the 'North Countree,' and such is the plot of B.s in French, Danish, and other tongues. Again, we have the B. of the girl who, doubting her lover, is taken by him to a secret place, and is there told by him that she must die. By a trick she succeeds in taking his life instead. Such a plot is almost universal. In the B.s of Bürger and Goethe, modelled on older types, we notice that the shades of the departed act as if alive. They

return to lie beside their lovers until cock-crow, and ride on swift steeds on which they often carry off the object of their earthly affections. So acts Clerk Saunders in the old Scottish B., and so do scores of ghostly wights in the B.s of all lands. This conception is drawn from Norse mythology. For example, we find in one of the Norwegian sagas the wife returning to the dead husband who is buried in the great mound on the moor by his dwelling. We thus find the same machinery employed throughout the B.s of many lands, however different the local colouring may be. But there are other marks which betray the universality of B. material. For example, we are never far away from the talking bird or the chorus of birds, the 'wee birdie' of the Scottish B.s which with warning accents bids the 'bonnie may' beware of the 'fause Sir John.' Again, we find that the generality of B.-mongers have a decided partiality for gold and silver, and that the heroes and heroines of their songs are always mightily bedizened. They are liberally bedecked with the 'red gould,' and 'siller' is always plenteous. They have 'roses till their shoon,' and a great display of feathers. Their body-linen is invariably white as snow, and the cramoisy and satins they wear are minutely specified with all the snobbery of a sycophantic bardhood. But there is wretchedness too. Hynd Horne and his like who come to claim their own are dressed as beggars, but the lordliness shines through their rags, and after receiving hospitality they stand forth in their native dignity and are duly remembered. In the refrains of such—in *Hynd Horne* it is 'The birk and the broom blooms bonny'—we find many

allusions to plants. We know not the wherefore of this popularity of the heath plants, which permit their names to recur in B. refrain alternately with 'down-derry-down,' and the like, but some deeper significance probably lurks behind what would seem to be mere caprice. Ghastly crime is often, too, found in the B. motif. The Lammikin who slaughters his may (maid), the luckless 'childe' who is drowned or smothered—invariably the possessor of 'gouden looks'—recur among the old, unhappy, far-off things with the dastard groom who goes in his master's stead to his lady's bower, and is slain by his exasperated lord.

The ballad in Britain. Practically no B. forms of Brit. origin of a greater antiquity than the 14th cent. have come down to us. One example from the 13th cent. is a 36-line poem *Indas* which is now accepted as an early B. In the 14th cent. the native Eng. composition began to find favour with the people to the detriment of the Fr. importations, and the 15th cent. appears to have been that of its highest ascendancy and its most abundant and successful production. In succeeding cents. the B. form became gradually neglected and remained so until the period of its resuscitation by Bishop Percy, after a period of nearly 300 years. In his *Reliques of English Poetry* he gave an impetus to the immense vogue of the romantic which dominated Eng. poetry for the next cent. The material whence Sir Walter Scott's *Minstrelsy of the Scottish Border* and its like was drawn was in all probability for the most part 'made' in the 15th and 16th cents. The *Ballad of Sir Patrick Spens*, for example, is regarded by some as a modern forgery, yet in its machinery and circumstances it bears the stamp of old. It was probably written in the 16th cent. from a still older B. contemporary with the times of which it sings—the days succeeding the death of Alexander III of Scotland, when the Maid of Norway was called to the throne. It was not the Chaucers, the Dunbars, the Lindsays, or Spensers who fostered the B., but the Blind Harrys, the Huchecrons, and the 'borrel' or rustic minstrels. The literature of the Brit. B. has been examined by Furnivall, Ritson, Madden, Halliwell, and others, and especially by Prof. F. J. Child (q.v.).

The ballad in Germany. Although the *Volkslieder* of the Ger. peoples is a form of considerable antiquity, it probably attained its present type at the hands of the minnesingers who clustered around the courts of the landgraves and petty kings of the Germany of the Middle Ages. At the court of Hermann, landgrave of Thuringia (c. 1180-c. 1200), poetical effort reached a high standard, and such singers arose as Wolfram von Eschenbach and Gottfried von Strassburg. Such 'epics' as the *Parzival* and *Tristan* of these poets were the lineal ancestors of the B. form, and we find their echoes in many a later effort. In the *Heldenbuch*, or great book of national heroes, and the *Nibelungenlied* we find gathered together a number of B.s, the sequence of which assists to make

up a completed whole. During the 15th cent. a satiric type of B. arose, and was succeeded by the comic B. of which *Till Eulenspiegel* is the form *par excellence*. During the Lutheran period the B. declined, but upon the romantic renaissance which in Germany had as its protagonists Klopstock, Wieland, and perhaps Lessing, the B. returned to fostering influences, and in the hands of Bürger, Goethe, Schiller, and Uhland attained perfection. The B.s of modern Germany do not possess the almost childlike brightness of those of the old *Minnelieder*, but are marked by a gloomy grandeur and mysticism.

The ballad in France. The earliest Fr. B.—perhaps the only one of early origin that has survived—is that of *Aucassin et Nicolette* (really a *conte-fable* or *nouvelle*), and with the withering of the *Langue d'Oc* before the *Langue d'Oïl* practically all the B. poetry of the former dialect must have vanished. Such 'epics' as the *Chanson de Roland*, *Ogier le Danois*, and the like, were probably a conglomeration of B.s. During what may be called the Arthurian period the B. appears to have been lost among the romances which, if they partook of the B. form, and were sung in the same manner as a B., were yet too extended to justify their inclusion in the same nomenclature. In medieval France, in short, the B. ran to a more extended and epic form, and thus lost that simplicity and brevity which were its chief characteristics. It is not until the 15th cent. that we get back to anything like the B., the rather affected and frigid efforts of Charles d'Orléans possessing some slight affinity with its *genre*. Villon, too, had B. affinities which, however, were counter-balanced by his richness of fancy and display of effort. With the rise of the romantic school in 1830, the B. came back to its own, and in the works of Victor Hugo, Gautier, Sainte-Beuve, and Emile Deschamps received liberal treatment and recognition.

The ballad in Spain. Sp. literature is rich in B.s. Perhaps the earliest type is that of the *Poema del Cid*, probably, like most early epics, composed of numerous B.s joined into a compact whole. The strife with the Moors inspired many B.s which in their turn might have been welded into another epic like the *Cid* had the master-hand been present. These are mostly anonymous, and deal with the deeds of noble knights, the love of fair ladies, Spanish and Moorish, and other chivalric matter. A good idea can be had of the quality of these B.s by a perusal of Lockhart's *Spanish Ballads*. In Spain the B. has mostly to do with romance pure and simple. A peasant or bucolic music arose separately, but although it approximates at times to the B. type it cannot altogether be classed with it. The B.s of Spain are in general composed in a more varied metre than those of other European countries, and have furnished many Brit. poets with models for the composition of narrative verse.

In other countries of Europe the B. may be said to have followed a course

similar to that indicated in the case of those countries dealt with. The foreign type of B. which bears most resemblance to the British is the Scandinavian, and there can be no doubt that sev. of our B.s are direct Scandinavian importations, whilst the reverse can also be maintained. Norman-Fr. forms also display some connection with ours, and the B.s of Brittany exhibit what might be described as a territorial connection with those of this country. The B. is by no means confined to Europe, and the various Asiatic countries possess forms which closely approximate to the European. S. America, too, has a B. literature of its own, and the U.S.A. is by no means destitute of folk-songs cast in B. form.

The ballad in music takes various forms: (1) the It. *balletta* (originally *ballata*, a dancing-piece), which was a song in dance-measure and sometimes accompanied by dancing; (2) tunes that became traditionally attached to literary B.s, such as *Edvard* or *Chevy Chase*; (3) songs or choral works in narrative form, especially of the romantic school, relating heroic or fantastic stories, such as Schubert's *Erkling* or Stanford's *La Belle Dame sans Merci*; (4) instrumental works illustrating or suggesting similar subjects in the form of symphonic poems for orchestra or of piano pieces (Chopin, Liszt, Brahms, etc.); (5) Eng. drawing-room songs of about the turn of the 20th cent., usually inferior music set to sentimental verses of no better quality.

Bibliography. COLLECTIONS: T. Percy, *Reliques of Ancient English Poetry*, 1765; J. Ritson, *Pieces of Ancient Popular Poetry*, 1791; Sir W. Scott, *Minstrelsy of the Scottish Border*, 1802-3; F. J. Child, *The English and Scottish Popular Ballads*, 1857-8, 1882-88 (with bibliography); Sir A. T. Quiller-Couch, *The Oxford Book of Ballads*, 1910; L. Pound, *American Ballads and Songs*, 1922; B. von Münchhausen, *Meisterballaden*, 1923. CRITICISM AND HISTORY: F. B. Gunmere, *The Popular Ballad*, 1907; T. F. Henderson, *The Ballad in Literature*, 1912; L. Bianchi, *Novelle und Ballade in Deutschland*, 1915; R. Graves, *The English Ballad*, 1927; L. C. Wimberley, *Folklore in the English and Scottish Ballads*, 1928; G. H. Gerould, *The Ballad of Tradition*, 1932; W. Kayser, *Geschichte der deutschen Ballade*, 1936; W. J. Entwistle, *European Balladry*, 1939; M. J. C. Hodgart, *The Ballads*, 1950.

Ballad Opera, type of Eng. stage piece the libretto of which consists of spoken dialogue interspersed with songs which, instead of being specially composed, have their words fitted to tunes already existing, either in the form of folk-songs or of popular contemporary melodies. The first and most famous example is *The Beggar's Opera* (1728) by John Gay. Many others appeared during the next 12 years, but the fashion declined after 1740.

Ballade, form of verse consisting of 3 stanzas of 8 or 10 lines, concluding with an envoi of 4 or 5 lines. Each stanza must include 3 rhymes only, and the same rhymes in the same order must occur in

each of the succeeding stanzas throughout the B. Each stanza, as well as the envoi, must have the same refrain. The envoi usually contains the dedication of the poem to some particular person, and often commenced with the title of the person to whom it was addressed, as 'prince' or 'sire.' It forms the climax of the poem. The B. is usually classed by prosodists among the forms utilised as *vers de société*. It must not be confounded with the ballad (q.v.). Modern B.s of excellence have been written by W. E. Henley, A. C. Swinburne, Austin Dobson, Andrew Lang, G. K. Chesterton, E. C. Bentley, Bayard Simmons, Paul Selver, Hilaire Belloc, and Théodore de Banville (qq.v.), who brought this and other medieval Fr. forms into fashion again. It is essentially an antique form modernised, and was probably first perfected by Villon.

Ballagi, Mór (originally Bloch, Moritz) (1815-91), Hungarian linguist and theologian. Jewish by birth, in 1843 he became Protestant. His main aim was to magyarise and convert the Hungarian Jews. Hence, he pub. Hungarian practical grammars and dictionaries; founded (in 1858) the *Protestáns egyházi és iskolai lap* ('Protestant Church- and School-paper'); and began the trans. of the Bible into Hungarian.

Ballance, John (1839-93), New Zealand Premier, b. Glenavy, Antrim, N. Ireland. He emigrated to Wanganui, where he was first a shopkeeper, then a journalist, and the founder of the *Wanganui Herald*. He took an active part in the Maori war of 1867. In 1875 he entered the House of Representatives; in 1878 became treasurer in Sir George Grey's ministry; resigned in 1879. He re-entered Parliament in 1884 as minister of lands and native affairs; became leader of the Liberal opposition in 1888, and Prime Minister in 1891. In politics he showed himself broadminded, and his treatment of the Maoris was pacific. He adopted the humanitarian ideals of Sir George Grey (q.v.) with quiet enthusiasm and promoted them with the practical common sense of the trained politician. See *Dictionary of New Zealand Biography*.

Ballanche, Pierre Simon (1776-1847), Fr. philosopher, b. Lyons. Early in life he succeeded in joining the literary circle represented by Madame Récamier and Chateaubriand. He was an exponent of the theocratic school of philosophy, being opposed to rationalism and upholding revelation and authority. His prin. work is *Palingénésie*, divided into 3 parts—I. 'L'Orphée'; II. 'La Formule'; and III. 'La Ville des expiations'—in which he may be said to outline the hist. and philosophy of the world, past, present, and future. His later *Vision d'Hébal* contains the supposed prophecies of a chief of a Scottish clan gifted with second sight, who sets down what he sees of the future hist. of the earth. See C. Huit, *La Vie et les œuvres de Ballanche*, Paris, 1904.

Ballantine, James (1808-77), author, b. Edinburgh. He is known for *Gaberlunzie's Walley* (1843), a miscellany in which the

items are supposed to be drawn from the wallet of a wayfaring pedlar. He was also the author of *The Miller of Deanhaugh*, and of some of the liveliest of Scottish humorous songs. One of the first to revive the art of glass-painting, he was appointed to provide stained-glass windows for the House of Lords in 1844.

Ballantine, William (1812-87), serjeant-at-law, b. London. Educ. at St Paul's School, he was called to the Bar in 1834, and being disposed to a literary and theatrical life, soon acquired a number of friends connected with these professions. His most famous case was the one in which he defended the Tichborne claimant. He successfully carried off sev. *causes célèbres*, especially that of Franz Müller, who was tried for murder in 1864. He also acted for the gaekwar of Baroda in 1875. He d. at Margate. Anecdotes of B. will be found in Montague Williams's *Leaves of a Life*, 1890.

Ballantrae, vil. in SW. Ayrshire, Scotland, once the centre of a thriving fishing industry, now noted for early potatoes. S. R. Crockett's *The Grey Man* is set in B., but R. L. Stevenson's *The Master of Ballantrae* centres round Borgeue, Kircudbright. Pop. 500 (of par. 1300).

Ballantyne, James (1772-1833), editor and publisher, b. Kelso. As a young man he founded the *Kelso Mail*, and was the first to introduce an improved style of printing into Scotland. This attracted the notice of Sir Walter Scott, whose productions he printed, not hesitating to advise certain alterations in the subject-matter of the MSS. In 1826 the company of which he was the head became involved in the bankruptcy of Messrs Constable. B. distinguished himself in the eyes of his contemporaries as a judge of dramatic literature.

His brother John was b. at Kelso in 1774. He took part in the business of his brother, and was known as a judge of *objets d'art* and works of antiquity. He pub. separately a number of celebrated works, notably Scott's ed. of the *British Novelists*, and the works of Beaumont and Fletcher. He also ed. 2 periodicals, *The Visionary* and *The Saleroom*. He d. at Melrose in 1821.

Ballantyne, James Robert (1813-64), Scottish orientalist; taught Oriental languages at the Naval and Military Academy, Edinburgh; was principal of, and prof. at Sanskrit College at Benares 1845-61; librarian to the India Office, London, 1861. He pub. numerous books aiming at rendering Indian philosophy familiar to European students, and W. thought to Indian intellectuals.

Ballantyne, Robert Michael (1825-94), author, b. Edinburgh, a nephew of the printer of Walter Scott's works. His descriptions of the life of the trapper and hunter dwelling in wild outposts gave him a reputation as a writer of books of adventure for boys, and his informative and interesting method of writing from personal experience has given his work a value not often associated with fiction of its class. Among his best-known books are *Ungava*, 1857, and *The Coral Island*,

1858. His *Personal Reminiscences in Book-making* appeared in 1893.

Ballarat, or **Ballaarat**, city of Victoria, Australia, 74 m. by railway WNW. of Melbourne. It is famous for its goldfields, which were discovered in 1851, and still yield a considerable revenue. But whereas the auriferous soil was found almost at the surface in the middle of last cent., it has now to be sought at a depth of about 2500 ft., and quartz mining has become the staple industry of the dist. The deepest mine, S. Star, yielded, from 1851 to 1930, over £85,000,000. The community is divided into B. E. and W., the pop. of the 2 portions aggregating 40,000. The city is modern in construction, and possesses many handsome buildings, besides factories, breweries, and mills. There are Anglican and Rom. Catholic cathedrals, art galleries, botanic gardens, an observatory, a museum, and a school of mines affiliated to the univ. of Victoria. B. is the third city of Victoria; it is an important railway junction, and, being nearly 1500 ft. above sea level, has an excellent and healthy climate. On 3 Dec. 1854, the method of licensing miners brought about a serious riot which culminated in a veritable battle known as the Eureka Stockade, where over 500 miners were attacked by 270 troops and police, who captured the stockade; about 30 miners were killed and some 60 wounded. Pop. 40,000.

Ballard, name of a famous family of Fr. printers of music who held the monopoly of their business for 2 cents., handing it down from one generation to another until the Revolution. They were enabled to resist all innovations in music-printing by their privilege, and were supported by the court. Robert B., the founder of the firm, received his privilege from Henry II in 1553; and each generation of the family was confirmed in its monopoly by successive royal commands until 1793, when monopolies were abolished by the Revolution.

Ballast, term used to denote any weight placed in a ship's hold, with the object of sinking her deeper in the water, to secure proper stability and safe sailing, when her cargo is too light. B. may consist of gravel, stone, sand, iron, or water. Modern steamers carry tanks forward, aft, and amidships, which can be filled with water to regulate the trim of the boat. The term is also applied to bags of sand and gravel used to steady a balloon. The word is used in engineering to denote the gravelly material laid as packing between railway sleepers.

Ballater, small burgh of Aberdeenshire, Scotland, 42 m. W. of Aberdeen, on the R. Dee. On account of its proximity to the royal residence of Balmoral and the numerous beauty spots in that part of the co. it is a favourite tourist centre, and the rail terminal on 'Royal Deeside.' Pop. 1320.

Ballenstedt, Ger. tn in the dist. of Halle, at the N. foot of the Harz Mts (q.v.), 35 m. NW. of Halle (q.v.). It was the first property of the house of Ascania (q.v.), and the tomb of Albert the Bear

(see ALBERT OF BRANDENBURG) is in the church. The tn is a health resort. Pop. 11,000.

Ballyny Isles, group of volcanic antarctic is. in the S. Ocean discovered by John Ballyny and H. Freeman, the commanders of 2 vessels sent out on a sealing expedition to the S. Seas, in 1838. The group was first seen 9 Feb. 1839. It consists of 5 is. which, proceeding from E. to W., are called Sturge Is., Buckle Is., Borradaile Is., Young Is., and Row Is. Young Is. rises to a peak, called Peak Freeman, which is 12,000 ft above sea level. Whales, penguins, seals, and Cape pigeons are numerous. Thick fogs are frequent, and navigation in the neighbourhood of the is. is dangerous from drifting ice. They belong to New Zealand.

Ballet (see also DANCING), one of the theatrical arts, in which the prin. mode of expression is the dance, this being allied, with rare exceptions, to music and spectacle. The origins of the art can be traced back to the It. courts of the Renaissance, when professional dancer-musicians produced lavish entertainments for special occasions, the dance technique employed being then already highly developed. As a result of Franco-It. contacts, It. dancing-masters made their appearance at the Fr. courts during the 16th cent. and, encouraged particularly by Catherine de' Medici, developed the *ballet de cour*, the most successful work of this type being Beaujoyeux's *Ballet Comique de la Reine* (1581). In succeeding reigns, and particularly under Louis XIV, many *ballets de cour* were produced in which the courtiers, often including the king, took part with a sprinkling of professional dancers. Encouragement of the arts was one of the cornerstones of Louis XIV's policy of *agrandissement* of the monarchy, and in 1669 the *Académie de Musique*, or the Paris Opéra, was founded with the exclusive royal privilege of producing opera in France. Until well into the 18th cent. the forms of B. and opera, as we know them, were often intermingled in the opera-ballet, the most historic of which was *Les Indes galantes* (1735) with music by Rameau. The first great ballerinas, Camargo and Sallé, fl. at this time, as did the great male dancer Dupré. The divorcing of B. from opera, and the introduction of the *ballet d'action* in the second half of the 18th cent., marked a revolutionary development. The credit for this innovation is generally given to Noverre (1727-1810), but others, notably Hilverding and G. Angiolini, were working simultaneously in the same direction. Noverre allied mime to the dance to produce an entertainment without recourse to song or speech, and his *Lettres sur la danse et sur les ballets* (first pub. in 1760) remains one of the basic and most important works on the aesthetics of B. During the 18th cent. B. spread to nearly every important cap. in Europe, including St Petersburg, Milan, and Copenhagen, where permanent B. schools were estab. as in Paris. Noverre's precepts were followed

in France by Dauberval, M. and P. Gardel, and Milon, while in Italy at the end of the cent. elaborate B.s in which mime held a more predominant place were being produced by S. Viganò. The 18th cent. saw a great development in technique, particularly among male dancers, the most famous being G. and A. Vestris, and improvements in costume gave the dancers more freedom of movement. Further progress was made in the 19th cent., particularly between 1820 and 1860, the period of the 'Romantic B.' The discarding of the heeled shoe led to the introduction of *pointe* work, which enlarged the ballerina's technique disproportionately to that of the male dancer. Brugnoli was one of the first ballerinas to dance on *pointes*. Marie Taglioni (q.v.) was the greatest dancer of that age, her chief rivals being Cerrito, Carlotta Grisi, Rosati, and Grahn. In sympathy with the Romantic movement, the most popular subjects for B.s shifted from tales of gods and heroes to legends of supernatural creatures with exotic settings, which were sometimes written by poets such as Gautier, and with the scenic progress then being made and the introduction of gas lighting an illusion much greater than ever before was achieved. Most famous of the B.s of this period were *La Sylphide*, 1831, and *Giselle*, 1841, from Paris, *La Esmeralda*, 1844, and the *Pas de Quatre*, 1845, from London, and *Napoli*, 1842, from Copenhagen, the important choreographers being Aumer, F. Taglioni, Henry, J. Coralli, Perrot, Mazilier, Saint-Léon, Bournonville, and Cortesi, and the teachers including Coulon and Blasis. Except in Russia, B. declined rapidly in popular favour from 1860 until the coming of the Diaghilev Ballet in 1909, but sev. works survive from the Paris Opéra repertory of this period, *Coppélia*, 1870, *Sylvia*, 1876, and *Les Deux pigeons*, 1886. In Russia, on the other hand, the importance of B. was maintained at St Petersburg, where M. Petipa dominated the scene from 1870 until 1903. Russia had long had a *corps de ballet* unmatched in any other country, and elaborate scenic resources of which fullest use was made, but Russian ballerinas were only just establishing themselves as the equal of It. visitors such as Zucchi and Legnani. Tchaikovsky composed scores of 3 B.s first produced in Russia in the last quarter of the 19th cent., and all 3 have now become classics: *Le Lac des cygnes*, 1877, *The Sleeping Beauty*, 1890, and *Casse-Noisette*, 1892. The great ballerinas of the period separating the Romantic B. and the Diaghilev B. were Zucchi, Mauri, Kshessinskaya, Preobrazenskaya, Zambelli, and Genée. In 1909 Serge Diaghilev (q.v.) brought a company of Russian dancers to Paris and for 20 years, by his genius in co-ordinating the talents of choreographers, dancers, musicians, and painters, he infused fresh vigour into B. in W. Europe, raising it from decadence to an artistic peak it had never known before. His first B.-master Fokine (q.v.) was almost as great an innovator as Noverre, and his B.s came as

a revelation, as did the dancing of Karsavina (q.v.), Lopokova (q.v.), Sokolova (an Englishwoman, Hilda Munnings), Nijinsky (q.v.), and Bolm, and later Spessivtseva (who went on to become *étoile* of the Paris Opéra), Danilova, Dolin, and Lifar. Of the other choreographers who worked for Diaghilev, the most important were Nijinsky, Massine, Nijinska, Balanchine, and Lifar. Foremost among the teachers of this period was Cecchetti, whose system is extensively used to-day, and who completed the training of Karsavina and Nijinsky, and taught Massine, Lifar, Markova (q.v.), and many other famous

been enhanced by such distinguished dancers as Darsonval, Chauviré and Vyroubova, Lifar himself, and Renault. Among the most vigorous manifestations of Fr. B. in recent years have been the performances of the Ballets des Champs-Élysées and the Ballets de Paris, both directed by R. Petit, among whose B.s may be mentioned *Les Forains*, 1945, *Carmen*, 1949, and *Le Loup*, 1953. The Diaghilev revolution has largely passed by Russia, where B. has followed a different path, preferring a greater realism in treatment and being much less adventurous in its association with the allied



Druet

'THE REHEARSAL,' BY DEGAS

A ballet school scene in the foyer of the Opera House, Paris, 1872.

contemporary dancers. The itinerant B. company did not die with Diaghilev in 1929, but its status and importance have gradually declined as the national companies have assimilated the lessons of the Diaghilev B. Among later impresarios who have attempted to follow in Diaghilev's footsteps have been René Blum, Col. de Basil, and the Marquis de Cuevas; it was the B. Russe de Monte Carlo, directed by de Basil and Blum, that presented to the world the 3 so-called 'baby ballerinas,' Tomanova, Baronova, and Riabouchinska, in 1932.

Contemporary foreign ballet companies. The most important companies to-day are the national companies of France, Britain, Russia, America, and Denmark. The Paris Opéra B. has taken on a new lease of life since the engagement in 1929 of Lifar, who has produced a great number of works, among them *Icare*, 1935, *Le Chevalier et la damoiselle*, 1941, *Suite en blanc*, 1943, and *Les Noces fantastiques*, 1955, and the company's tradition has

arts of music and painting, although the technical standards remain at a very high level. The contemporary Russian ballerina Ulanova may be classed with Fonteyn and Chauviré. The strength of the Dan. B. repertory lies in the classics from its past, Galeotti's *The Whims of Cupid and the Ballet-master*, 1786, and numerous B.s by the 19th-cent. choreographer Bournonville, all of which have been faithfully preserved. It owes its present prestige largely to Lander, its B.-master from 1932 to 1951. Amer. B. has only recently become culturally important, the leading contemporary companies in the U.S.A. being B. Theatre and the New York City B., of which latter company Balanchine (q.v.) is the prin. choreographer. Sev. Amer. ballerinas have achieved international fame, notably Hightower, Alonso, Kaye, and Marjorie and Maria Tallchief.

Ballet in England. Eng. B. is also of relatively recent development, although B. has been seen in England since the 18th

cent. The pantomime B.s of John Weaver early in the 18th cent. foreshadowed Noverre's reforms, but were not followed up. At the King's Theatre, London (the It. opera-house), many famous foreign choreographers and dancers were engaged by the season, but few Eng. names appeared: the male dancer Slingsby was one of the rare exceptions. In the early 19th cent. the preponderance of the foreign element continued, although J. d'Egville and J. Byrne produced B.s with casts of Eng. dancers. One of the most promising Eng. dancers of the 19th cent., Clara Webster, d. at the age of 23 in 1844, a few days after being severely burnt at Drury Lane during a performance. The King's (from 1838, Her Majesty's) Theatre went through a period of great glory during the years 1842-3, when the choreographer Perrot's creative powers were at their height, but afterwards B. rapidly declined in popularity and almost vanished from the opera-house, to appear, however, at music-halls such as the Alhambra and the Empire Theatres, where a succession of foreign ballerinas triumphed. Early in the 20th cent. Adeline Genée (q.v.) gained wide popularity in London. It was, however, the Diaghilev B., which first visited London in 1911, and the popularity of Anna Pavlova (q.v.) which prepared the ground for the estab. of a national B. in England. Sev. Eng. dancers appeared with distinction in Diaghilev's company, the most notable being Sokolova, Markova, and Anton Dolin. In 1930, after the death of Diaghilev, the Camargo Society was formed to stimulate interest in B. and contributed much to the development of the Vic-Wells B. (later Sadler's Wells B.) and the B. Club (later B. Rambert), being discontinued in 1933, when its task was considered done. In that year, which saw the return of the B. Russe, the Vic-Wells B. was already firmly estab. The Sadler's Wells B. (called the Royal B. (q.v.) from Jan. 1957) now holds its own with other great national companies and already has a tradition of its own. It is everywhere held in great esteem and respect, particularly in America where it is billed as 'the fabulous.'

The assimilation of other influences. All these great companies of to-day base their repertoires on the same classical B. technique, although styles vary in nuances from company to company. B. has also been subjected to other influences, such as the ideas and technique of so-called free and modern dancers, the most important of whom have been Isadora Duncan (q.v.), Kurt Jooss, and Martha Graham: But the classical technique which has developed continuously over a period of some 5 cents. has remained the foundation of B., and no doubt will continue to do so, for the hist. of the art shows the strength of the main stream of its tradition, which always emerges unimpaired from every phase of innovation, however drastic and revolutionary.

See A. Haskell, *Ballet*, 1938, and *The Making of a Dancer*, 1946; D. Lynham, *Ballet Then and Now*, 1947; I.

Guest, *The Romantic Ballet in England*, 1954.

Ballin, Albert (1857-1918), Ger. ship-owner, of an old Jewish family in Hamburg. Joined his father's emigration business in 1874. Was agent for some Eng. shipping companies. Joined Hamburg-America line in 1886 and became director-general. Had gifts as a negotiator and worked for a political agreement between Germany and England. On the Ger. collapse in 1918 he committed suicide 2 days before the armistice of 11 Nov.

Ballin, Claude (1615-78), Fr. goldsmith, who copied the works of Poussin, and who was employed by Louis XIV. His nephew, Claude B. (c. 1660-1754) was also a noted goldsmith, his chief work being the coronation crown of Louis XV.

Ballina, seaport and tn of co. Mayo, Rep. of I., built on both banks of R. Moy, some 6 m. S. of Killala Bay. The E. part of the tn is called Ardnaree. Ships from Brit. and Continental ports discharge cargoes at B. quay, and live-stock and farm produce are exported. The R. Moy and Lough Conn are favourite resorts for fishermen, and the salmon fishery is one of the most important in Ireland. B. has flour- and grain-mills, printing, works, saw-mills, and mineral-water factories. Pop. 6225.

Ballinasloe, mkt tn of co. Galway, Rep. of I., on the R. Suck, a trib. of the Shannon. The ruins of the celebrated Kilconnell Abbey (Franciscan, 1400) are near by. Garbally Castle, former seat of the Earl of Clancarty, is now St Joseph's College. B. is noted for its horse, sheep, and cattle fairs, especially the great Oct. fair during the week in which the second Tuesday of the month occurs. Industries include modern shoe and meat and bone-meal factories, and limestone quarries. Pop. 5600.

Ballingeary, vil. in co. Cork, Rep. of I., 14 m. W. of Macroom. The Irish college is widely attended during the summer. Pop. 100.

Ballinrobe, tn in co. Mayo, Rep. of I., on the Robe near its mouth in Lough Mask, famous for its brown trout fishing. Pop. 1200.

Balliol College, Oxford, founded by Sir John de Balliol of Barnard Castle, Durham, and his wife Dervorguilla as a house for poor scholars some years before 1266. It was part of a penance imposed on John de Balliol by the Bishop of Durham. In 1282 Dervorguilla gave the house a charter. The house consisted of 16 scholars who were to be students of arts. In 1340 Sir Philip de Somerville enlarged the foundation by the addition of 6 further scholars in arts providing that 6 of the scholars should proceed to the study of theology. Wycliffe was master c. 1356-61. In the 15th cent. Wm Gray, afterwards Bishop of Ely, lived in the college, and after his death in 1473 his books came to the library, the largest private collection to survive in England from the Middle Ages. New statutes were drawn up by Richard Fox, Bishop of Winchester, in 1507. The original hall

(now the Lower Library) and the Upper Library date from c. 1430, but the rest of the buildings are 18th–20th cent. The rise of the college to a pre-eminent place in the univ. dates from the early 19th cent., when under a series of able masters and tutors it attracted some of the best scholars from the public schools. Benjamin Jowett was fellow from 1838 and master from 1870–93. Among its distinguished graduates are Adam Smith, Robert Southey, Matthew Arnold, A. H. Clough, T. H. Green, Gerard Manley Hopkins, Swinburne, Viscount Grey of Falloden, Lord Oxford and Asquith, Lord Milner, and Wm Temple.

Ballista, engine used by the Romans for propelling heavy missiles in siege operations. It was constructed on the same principle as the catapult, the difference being that the catapult was used for propelling arrows, stones, etc., in siege and field warfare, whilst the B. discharged heavy beams and large stones for the battering down of buildings, or, in other words, the distinct high-trajectory B. discharged heavier stones from the end of rotating arms. The motive power in both types of engine is supplied by tightly twisted hemp, sinews of animals, or raw hide. Two such skeins were firmly fixed vertically in a heavy wooden framework; two stiff wooden arms were inserted in the skeins and were attached to a bow-string which was drawn back by a winch and locked by a trigger mechanism. The projectile was propelled through a window in the vertical framework. See Sir R. Payne-Gallwey, *Projectile-throwing Engines of the Ancients*, 1907.

Ballistic Pendulum, see PENDULUM.

Ballistics, study of the motion of projectiles. It consists of 2 main branches, interior B. and exterior B. (see PROJECTILE). Interior B. deals with the motion of the projectile inside the bore of the gun, and is concerned with providing a theoretical basis for the methods and rates of burning of various kinds and shapes of propellants, the ultimate object being the determination of the maximum pressure set up by the gases inside the gun, and the velocity with which the projectile is ejected from the muzzle. The theory having been developed, the practical application is the fixing of the weight of the propellant, and the size and shape of its component pieces or grains, necessary to produce any desired velocity in a particular gun without subjecting it to a pressure greater than the material can stand. The consideration of the stresses in the material itself belongs to the prov. of the gun construction and design. Exterior B. deals with the motion of the projectile outside the bore, and its prin. problem is the calculation of the path of a given projectile once its muzzle velocity and the elevation at which it was fired are known. The solution of this problem enables the ballistician to construct range-tables by means of which the gunner can lay his gun so as to hit a given target. In investigating the problem, measurements have to be made to ascertain the nature

and amount of the air's resistance to the shell; how its path is affected by the weight, shape, and steadiness in flight of the projectile and how by the atmospheric conditions of temp., air density, and humidity; and, finally, what amount of twist must be given to make the projectile come down nose first, and how this twist affects the flight of the projectile. These measurements are usually considered under the heading of experimental B., and the term exterior B. is properly applied to the calculation of trajectories once the necessary data regarding velocity, elevation, and air resistance are known.

Developments in anti-aircraft defence have led to increased interest and research in the production of accurately burning time fuses for projectiles. This section of B. belongs both to interior B. as regards the rate of burning of the powder of the fuse under various pressures, and exterior B. both as regards the variations in pressure occurring as the projectile travels along the trajectory and the time taken for it to reach various points on that trajectory.

Bomb-dropping from aeroplanes calls for a knowledge of exterior B., bomb sights being constructed from ballistic data obtained from experiments on the air's resistance to bombs of different shapes and sizes moving at various speeds. See FIREARMS and PROJECTILE. See also C. D. Cummings, *Everyday Ballistics*, 1950.

Ballistite, smokeless explosive formed from gun-cotton. It is very similar in composition to cordite and the various blasting gelatins.

Balloch, vil. of Dunbartonshire, Scotland, in Bonhill (q.v.) par., at the S. end of Loch Lomond. It is a rail terminus for the loch steamer. Pop. 3500.

Ballonius, see BAILLOU, GUILLAUME.

Balloon, lighter-than-air aircraft (aerostat), consisting of an envelope which contains a gas lighter than the surrounding atmosphere. The envelope, with any equipment attached to it, will then rise if the volume of light gas is sufficient. The lighter-than-air principle, originally suggested no doubt by the sight of clouds, became the subject of curious speculation during the Middle Ages; waited until 1670 for Francisco Lana to suggest the evacuation of 4 copper spheres to act as a lifting force (forgetting that the spheres would have collapsed from atmospheric pressure); was possibly incorporated in a toy hot-air B. by Gusmão at Lisbon in 1709 but not proceeded with; and finally suggested itself to 2 papermakers—the brothers Montgolfier—of Annonay in France. On 5 June 1783 they sent up a sizeable model hot-air B. in public at Annonay, and dispatched a description of the event to Paris, neglecting, however, to state what the lifting medium was. The great Parisian physicist, Prof. Charles, reading this account, concluded that the brothers had raised a sphere by inflating it with Cavendish's 'inflammable air' (hydrogen). He thereupon set to work and designed a model hydrogen B. which

he sent up from Paris on 27 Aug., preparatory to the construction of a full-sized man-carrying vehicle. Meanwhile the Montgolfier brothers had arrived in Paris and, to the astonishment of Charles, started building a large B. which he saw immediately was a hot-air machine and not a hydrogen one as he had believed.

The first Montgolfier triumph was the sending up of a cock, sheep, and duck in a basket from Versailles (19 Sept.); and then, after tethered ascents, a man-carrying version which, piloted by Pilatre de Rozier and the Marquis d'Arlandes, made the first aerial voyage of hist., a 5½-m. journey from the Bois de Boulogne across Paris, on 21 Nov. 1783. Charles soon finished his full-sized hydrogen B., with a rubberised envelope, and on 1 Dec. 1783 made the first 'hydrogen' voyage (of 27 m.) with one of the brothers Robert. The *Charlière* type of B. was much more remarkable than the *Montgolfière*, as it was virtually the modern B. complete with net over the envelope to support the basket, valve in the crown and ballast to control the height, and a barometer to act as altimeter. Only the ripping panel (invented in 1839) was missing from this *ab initio* invention. The *Montgolfière*, after a short but picturesque career, including—in 1784—the conveyance of the first lady to fly (Mme Thible), soon went out of fashion as it was far less efficient than the *Charlière*. However, it did appear from time to time in the 19th cent. to take up parachutists and even to carry out the first air-raid of hist., when the Austrians used pilotless hot-air B.s with timing devices to bomb Venice in 1849.

The *Charlière* estab. the B. as a new and safe means of locomotion. It crossed the Channel in 1785 (Blanchard and Jeffries), having taken up the same crew for vague scientific experiments the year before, and went on to become familiar and popular the world over. In 1794 hydrogen B.s were used by Napoleon for military observation; in 1797 a B. took up the first successful air-to-ground parachute jumper (Garnerin); and in 1804 there started the serious use of B.s for scientific investigation (Gay-Lussac and Biot). Coal-gas was introduced as a cheap alternative lifting agent in 1821, and from then onwards the B. became an accepted vehicle for scientists, showmen, and adventurers, with military observation, always tethered of course, as a sideline in most of the subsequent wars, a function in which the spherical gave way to the sausage-shape (1896) and finally to the modern streamlined and finned Caquot type (1916), which to-day is mostly relegated to barrage duties.

Within a few months of its invention, the B. began to irritate and challenge its pilots by its lack of dirigibility. A B., they soon discovered, would only go where the wind was going and at the wind's pace. So they began to navigate it, with elongated envelopes and without, with hand-driven rotating fans and even with aerial oars; but all to no avail, without prime-movers more powerful than

human muscles. The first feasible dirigible airship, steam-driven, was made by Giffard in 1852, and the first practical dirigible was the electric-powered *La France* built by Renard and Krebs in 1884. Thereafter, with rapid improvement of engines and propellers, the airship became an accepted form of locomotion, and indeed the first flying machine to be raised, sustained, and steered at will. See AIRSHIP.

B.s in the 19th cent. were popular sights in Europe and America, most of them being flown by professional aeronauts or showmen who made their living by ascending at fairs and other entertainments, and occasionally varying their routine by riding the air on horses, or even stage, and giving nocturnal firework displays. Women, too, had long since taken to the air, both as B. pilots and parachute jumpers, and they added a quota of charm to what could easily have become a somewhat tame entertainment. Throughout the cent. there was, of course, a full enough programme of aerostatic adventures and tragedies over and above the many thousands of routine ascents for entertainment. But amongst adventures and tragedies 2 stories stand out as sagas in the cent.'s ballooning hist. In the Prussian siege of Paris (1870-1) no less than 66 B.s left the city with cargoes of refugees and carrier-pigeons, the latter returning with micro-filmed letters for the beleaguered pop. Then in 1897 the Swedish explorer Andrée set off by B. from Danes Is. with 2 companions in an attempt to float across the N. Pole: they disappeared into the arctic mist, never to be heard from again. In 1930, by an outrageous stroke of chance, the remains of the expedition, complete with diaries and photographs, were discovered perfectly preserved beneath the ice of White Is., Spitzbergen. Long-distance flights saw a record created in 1836 by Green, Holland, and Mason when they flew 480 m. non-stop from London to Weilberg, a record for trips out of England which remained unbeaten until 1907. Scientists ascended from time to time and made their studies of the atmosphere; and in 1893 the science of meteorology enlisted the B. as unmanned instrument carrier, a role it has played with distinction ever since. The 20th cent. saw the final blossoming and decline of ballooning as a sport, and the growing service of the unpiloted, and occasionally the manned, B. as a carrier of instruments into the upper atmosphere. Thousands of such small B.s ascend annually, and, less often, translucent giants of polythene which rise as high as 22 m. The official height record for manned B.s stands at 100,000 ft. made in 1957 by Maj. D. Simons, Amer. Air Force doctor. The non-stop distance record was made in 1914 by Berliner and still stands—1890 m. The 20th cent. has also seen the revival, by the Japanese, of the unmanned 'bomber-B.s' (which were sent across the Pacific to America in the Second World War); the declining use of observation B.s; the continued use of barrage B.s; the use of B.s

for carrying propaganda leaflets, and for such curious tasks as taking up wireless aeriels for surviving airmen and sailors adrift on the sea. The first decade of the present cent. deserves a note on its own, for, from the founding of the Aero Club (now the Royal Aero Club) in 1901, it saw a renaissance of ballooning as a sport, a period which suffered eclipse only when the aeroplane showed signs of becoming a practical proposition about 1909-10. Ballooning as a sport still lingers on but is chiefly confined to a handful of continental enthusiasts. Curiously enough, one of the longest traditions of ballooning



For Photos

BARRAGE BALLOONS

stands to the credit of the U.S.A., owing to that country's long use of dirigible airships and the practice of training their pilots in free ballooning.

The following are details of the construction and equipment of a typical large sporting B. of about 1907. Maximum capacity for the type in those days was 80,000 cub. ft. The envelope, of treated silk or other material made up of sections called 'gores,' had a valve in the crown operated by a line hanging down inside and emerging through the dangling neck, which was kept open throughout the flight so that the expanding gas could blow off harmlessly: there was sometimes a separate filling tube attached to the envelope; otherwise the ground filling hose would be coupled directly on to the neck. Then there was the ripping panel—nearly half a gore—which was torn away inside the envelope to empty the B. rapidly on landing. The envelope was

covered by a net which ended in leading lines which supported the hoop; and toggled on to the hoop were the car-lines which supported the basket. Also fixed to the hoop were the ends of the grapnel rope and the trail rope, both of which were kept coiled on the outside of the basket, the trail-rope being let down when flying over 'unoccupied' land where its heavy swelled end would drag along the ground and act as automatic ballast. Ballast proper of sand was in 20-lb. or 30-lb. bags, both in and outside the basket, and the other equipment included maps, compass, aneroid barometer (as altimeter), and statoscope (for rate of rise or fall). Flight was controlled by judicious use of ballast and valve-line according to the height desired and in relation to the amount of sun—or lack of it—shining on the envelope and hence expanding the gas.

Ballot (It. *ballotta*, dimin. of *balla*, a ball), a little ball used for secret voting; hence 'voting by B.' is secret voting. Under the Athenian and other democracies in ancient Greece this method was known as *psēphisma* (from *psēphos*, a pebble, the original instrument of balloting). It was used on all questions affecting the status of individuals. These were of 2 kinds: lawsuits, and proposals of ostracism in the ecclesia. A vote for ostracism (q.v.) was recorded by inscribing the intended victim's name on a potsherd (ostrakon). The elaborate voting machinery of the Athenian courts in the 4th cent. BC is described at great length by Aristotle in his *Constitution of Athens*, which also gives particulars of a curiously shaped apparatus used instead of an ordinary ball and designed to prevent the insertion by each dicast of more than one vote into the B. box. At Rome the system of open suffrage allowed of so much corruption and intimidation that a series of laws (139-107 BC) prescribed the use of B. for all business transacted in the popular assemblies. Secret voting at elections of members of Parliament was advocated by Eng. reformers in the early 19th cent.; it was included in the draft of the Reform Bill of 1832, a Bill on the subject having been introduced by O'Connell in 1830. It was first used in 1870, in the London School Board elections. Two years later Forster's Ballot Act introduced it into parl. and municipal elections. The practice is now in force at elections in all countries where a constitutional gov. prevails.

Ballou, Hosea (1771-1852), Amer. Universalist clergyman, b. Richmond, New Hampshire; son of Maturin B., a Baptist minister. In 1794 B. became a pastor at Dana, Massachusetts. From 1817 until his death he preached as pastor of the second Universalist church at Boston. Founder and editor of the *Universalist Magazine* (later called the *Trumpet*), the *Universalist Expositor*, and the *Universalist Quarterly Review*. His *Notes on the Parables*, 1804, a treatise on the Atonement, estab. him as chief Amer. expositor of Universalism.

Ballou, Hosea (1796-1861), grand-nephew of the above, b. in Guilford,

Vermont, also a Universalist preacher, and associated with his uncle in editing the *Universalist Quarterly Review*. Advocated the Universalist estab. of Tufts College at Medford, Massachusetts. He wrote *Ancient History of Universalism down to AD 553*, 1829.

Ballou, Murray Maturin (1820-95), son of the first Hosea B., pioneer of Amer. illustrated Journalism. Ed. *Gleason's Pictorial*, later known as *Ballou's Pictorial* and founded and ed. the *Boston Daily Globe*. Wrote a life of his father and a hist. of Cuba.

Ballybay, mrkt tn of co. Monaghan, Rep. of I., 10 m. S. of Monaghan. It has a tannery and is the centre of a flax-growing area. Pop. 1000.

Ballybunion, seaside vil. in co. Kerry, Rep. of I., 9 m. NW. of Listowel. It has a wireless station. Pop. 956.

Ballycastle, mrkt tn in the N. of co. Antrim, N. Ireland, opposite Rathlin Is. The castle was built by the Earl of Antrim in the reign of James I. It is noted for its large Lammas Fair on the last Tuesday in Aug. Pop. 2600.

Ballyclare, mrkt tn of co. Antrim, N. Ireland, 10 m. ENE. of Antrim. It has important bleaching, dyeing, and finishing works. Textile machinery is also manuf. for both the home and the export markets. Pop. 4100.

Ballymahon, mrkt tn of co. Longford, Rep. of I., in the heart of the Goldsmith country. Pop. 650.

Ballymena, tn in co. Antrim, N. Ireland, on the R. Braid, a railway centre on the Belfast-Londonderry line. Linen manufs. were introduced about 1733, and are an important feature of the tn; agric. industries are also carried on. Pop. 14,200.

Ballymoney, tn in co. Antrim, N. Ireland, centre of a large agric. area. It has bacon-curing, milk products, jam, and spinning industries. Pop. 3300.

Ballymote, mrkt tn in the co. of Sligo, Rep. of I. In 1300 Richard de Burgh built a castle here the remains of which are still standing, and it was the scene of hostilities in 1641 and 1652. There are also the ruins of a Franciscan foundation of the 13th cent. The friars have left a literary monument in the *Book of Ballymote*, a MS. now in the possession of the Royal Irish Academy. It is a miscellaneous collection of prose and verse, written in Gaelic, and compiled about 1391. The book was once in the possession of the O'Connell family, who bought it for 140 cows. A facsimile reprint was issued in 1887, ed. by Prof. Atkinson. The district is renowned for archaeological remains and historic legends. Pop. 1000.

Ballynahinch, mrkt tn of co. Down, N. Ireland, 11 m. NW. of Downpatrick. B. is also an alternative name for Connemara (q.v.).

Ballyshannon, seaport of co. Donegal, Rep. of I., at the mouth of the Erne. Owing to a bar, the harbour is only available for small craft. Remains exist of a castle of the O'Donnells, where the English were defeated in 1597, and of the

Cistercian abbey of Assaroe (1 m.). Wm Allingham was b. here. The Erne has been harnessed above the tn for the national hydro-electric scheme. Pop. 2800.

Balm (*Melissa officinalis*), species of Labiatae found in Europe and W. Asia, and cultivated in Eng. and Amer. gardens for its sweet scent. It has an upright stem, toothed, ovate leaves, and flowers of faint yellow or white. The leaves are used in medicine for their tonic and stimulant properties. Bastard B. (*Melittis melissophyllum*) is the only species of its genus, and is found in S. Europe; it also belongs to the Labiatae.



BALM

Balm of Gilead, or **Balsam**, oleon-resin produced from the *Commiphora opobalsamum* and used in oriental countries for its sweet scent and medicinal properties. It is referred to in the O.T. and by many anc. writers, who affirm its power to heal. See COMMIPHORA.

Balmaceda, José Manuel (1838-91), Chilean politician, b. and d. at Santiago. As a politician he joined the Liberal party and later became president of the rep. of Chile. He did much work for the development of public instruction and for the army and navy. He also promoted the construction of railways.

Balmes, Col de, mt pass situated between Mts Blanc and Dent du Midi. It is traversed by the road from Martigny to Chamonix. Its highest point is 7200 ft above sea-level.

Balmerino, James Elphinstone, 1st Baron (1553-1612), Scottish politician. Under James VI he was appointed judge and royal secretary. He was made Lord B. in 1604. In 1599 he was responsible for sending a cordial letter from James to Pope Clement VIII without the king's knowledge. James repudiated the letter, and B. was imprisoned.

Balmes, or Balmes, Jaime Luciano (1810-48), Sp. polemist and philosophical writer, b. Vich in Catalonia. He founded a political paper of a clerical

and monarchical character in Madrid in 1844, calling it *El Pensamiento de la Nación*. His *Filosofía fundamental*, 1848, has been trans. into Eng. His *Obras Completas* were pub. in 2 vols., 1948.

Balmont, Konstantin Dmitriyevich (1867-1943), Russian poet of Scottish descent, the most talented among the older Symbolists, famous for the melodiousness of his verses. After 1918 he lived in exile in Paris.

Balmoral Castle, residence of the British sovereign in Aberdeenshire, Scotland, situated on the r. b. of the Dee, which at this point is crossed by a suspension bridge. The prince consort acquired it from Sir Robert Gordon in 1852 and gave it to Queen Victoria, together with the estate attached. It is built in granite and has an E. tower 100 ft. high, which commands a magnificent view.

Balnaves, Henry (d. 1579), of Halhill, reformer, b. of poor parents at Kirkcaldy, Fife, and studied at St Andrews Univ. and at a free school at Cologne. He acted for some time as a procurator in the courts of St Andrews and then removed to Edinburgh, where in 1538 James V made him a lord of session. On the accession of Mary (1543) B. was promoted to the office of secretary of state, and was instrumental in getting the Holy Scriptures trans. into the Scots vulgar tongue. He was confined for 6 months in the castle at Blackness for his aggressive Protestantism. In 1546 he joined the murderers of Cardinal Beaton in the castle of St Andrews. In the following year he was captured by the French and was shut up in the castle of Rouen as a prisoner of war. In 1554, when the dowager queen, Mary of Guise, became regent of Scotland, B. was released and his forfeiture rescinded. On his return to Scotland he took an active part on the side of the lords of the congregation, and in 1563 was appointed a lord of session and was chosen as one of the commissioners to revise the *Book of Discipline*. During his imprisonment he wrote a treatise on justification, which was pub., with a preface by Knox, under the title of *A Confession of Faith*.

Balneariae Lixivienses, see BAGNÈRES-DE-LUCHON.

Balneology and Balneotherapy, science of baths and their effects upon the system. Baths act more by modifying temp. than by skin absorption. The *cold bath* (45-66° F.) causes a contraction of the vessels of the skin and consequently drives the blood into the internal organs, where the resulting dilatation causes an exhilarating after-effect if the immersion be of short duration. The cold bath is thus valuable as a tonic. The *tepid bath* (85-90°) is of value in fevers through actual heat abstraction. Between 93° and 95° baths are at the point of thermal indifference; they do not change the movement of the bloodstream and have a sedative effect on the nervous system. Baths of higher temps. promote circulation in the surface blood-vessels, and the *hot bath* (103-108°) was at one time used to encourage the

excretion of toxic products through the skin. If the immersion be prolonged there may be weakness of the heart, with the possibility of fainting. The *Turkish bath* is a hot-air bath where the patient passes through compartments ranging in temp. from 100° to 200°. It is used for promoting perspiration. It is deleterious in fatty degeneration of the heart. The *Russian bath* is a vapour-bath in which steam is generated by throwing water on heated mineral or metallic surfaces; it is of value in rheumatism. The *douche* is a bath where water is forced by considerable pressure upon the surface of the body; it is used in insomnia and the coma of alcohol or sunstroke. The *shower-bath* is a douche where water is forced against the body from a nozzle with numerous perforations; it is used as a general tonic.

There are also special forms of bath where the body is immersed in peat, mud, slime, pine-leaves, herbs, brine, sand, bran, malt, tan, glue, milk, soap, acid, mustard, etc. Air-baths are dealt with under AEROTHERAPEUTICS, and electric baths under ELECTROTHERAPY.

Balneotherapy is a term generally restricted in application to treatment at spas, where patients systematically drink and bathe in water naturally mineralised, or artificially modified at the places where the springs emerge from the earth. The beneficial results of spa treatment in many types of diseases are undeniable, but there is some difficulty in apportioning the credit among the various curative factors in such treatment. The usually favourable climate, the submission of the patient to a regime that would probably be relaxed at home, the presence of physicians with special experience, the provision of specially appropriate appliances and organisation, and the combination of regular exercise in a good atmosphere with systematic medical treatment, all contribute in varying measures to the well-being of the patient. As to the waters themselves, it is undoubtedly true that many of them lose their properties when bottled and exported, and cannot be artificially prepared so as to produce the same conditions, or contain such subtle ingredients that their composition is not wholly known. It has been suggested that the warm mineral springs consist of water which is formed by the combination of hydrogen distilled from granite rocks at great depths with oxygen derived from metallic oxides also found there, thus producing what is called nascent or virgin water. Many waters also contain radium emanation, which has a therapeutic value in certain morbid conditions. The bubbles of carbonic acid gas, which have such an exhilarating effect on the skin, cannot be exactly reproduced in baths artificially charged with carbonic acid.

Spa treatment is suitable in the sub-acute or chronic stage of disease, where the patient has a good supply of reserve force. Acute cases, or those tending to a fatal issue at an early period, should not be recommended; serious visceral disease, advanced arterio-sclerosis, serious mental

or nervous depression are also unsuitable, whilst children and old people should have recourse to climatic influences only.

The chief object of spa treatment is to promote excretion by way of the kidneys, bowels, and skin. For elimination by the kidneys the alkaline waters at Vichy, Bad Neuenahr, Vittel, Contrexéville, Wildungen, Evian-les-Bains, and Aix-les-Bains are suitable. For elimination by the bowels the waters containing sodium sulphate are useful, as at Marienbad, Karlovy Vary (Karlsbad), Brides-les-Bains, and Cheltenham. Arthritic ailments are best suited by Aachen, Aix-les-Bains, Bath, Droitwich, Harrogate, and Buxton. Nervous diseases are specially provided for at Oeynhausen, Schlangenbad, and Church Stretton. Colitis is a leading speciality at Plombières and Châtel-Guyon. Primary anaemias are treated at Schwalbach, Spa, and St Moritz, whilst for secondary anaemias Royat, La Bourboule, Uriage, Harrogate, and Llan-drinod are suitable. Marienbad is specially recommended for the systematic treatment of obesity. Diabetic patients will secure experienced treatment at Karlsbad, Brides-les-Bains, Neuenahr, Vichy, Vittel, Royat, Buxton, Gastein, Evian-les-Bains, St Moritz, and other spas. Phlebitis and varicose veins are specialised in at Bagnols-de-l'Orne. Luchon and Schinznach have a good reputation for the cure of skin diseases, and Caunteris attracts sufferers from throat maladies. Famous Amer. watering-places are Hot Springs, Arkansas; French Lick Springs, and W. Baden, Indiana; White Sulphur Springs, W. Virginia; and Saratoga Springs, New York. See R. G. Gordon and F. G. Thomson, *The Physiological Principles of Hydrology*, 1930.

Balquhider, vil. of Perthshire, Scotland, at the head of Loch Vail and below the braes of B. It is celebrated in the hist. of Rob Roy. Pop. 200.

Bairampur, tn in Uttar Pradesh, India. It is the home of the leading talukdar of Oudh, and the most convenient centre for a visit to Saheth-Maheth, site of the anct city of Sravasti, and of the Buddhist convent of the Jetavana, where the Buddha is said to have lived and preached for 25 years.

Balsa, raft or fishing-boat, used by Indians on the Pacific coast of S. America. It is constructed usually of floats made of logs of the B. tree. B. wood is a light useful timber now used in the construction of aircraft.

Balsam (Gk *balsamon*), name given in medicine to many resins and oils taken from plants of different kinds, but given in particular to B. of Peru and of Tolu. These two varieties come from leguminous plants, the first species being known as *Myroxylon pericarpe*, the second as *M. toluiferum*. Liquidambar, a balsamic product of *Liquidambar styraciflua*, is sometimes called white B. of Peru. B. of Copaiba is also obtained from many varieties of the genus *Copaifera*. Bs have a pleasant fragrance which renders them of service in making confectionery

and perfumes; they also have tonic properties.

Balsam (*Impatiens balsamina*), tender annual, native of India, with many double-flowering forms, bearing large flowers of various colours; raised under glass for summer and autumn colour. See IMPATIENS.



BALSAM

Balsam Apple, see MOMORDICA.

Balsaminaceae, family of Dicotyledons, which contains only 2 genera, *Hydrocera* and *Impatiens*, the chief. It has numerous species of herbs which are cosmopolitan and are remarkable for the elastic force with which the valves of the capsular fruit contract and eject the seeds. The flowers are regular zygomorphic, have 5 petaloid sepals, 5 petals, 5 stamens, and 5 carpels which are united, superior, and contain numerous ovules.

Balsamo, Giuseppe, see CAGLIOSTRO.

Balsamodendron, see COMMIPHORA.

Balsham, Hugh de (d. 1286), Bishop of Ely. He succeeded Wm de Kilkeny at Ely in 1256. In 1280 he obtained a charter to introduce 'studious scholars' into his hospital of St John, Cambridge, in place of the secular brethren. In 1284 he founded Peterhouse, Cambridge, for his own pupils.

Baltard, Louis Pierre (1764-1846), Fr. architect, engraver, painter, and author, b. Paris. He at first became an engraver, then went to Italy, where he served as an architect, but owing to the revolution he returned to Paris and entered the army. He afterwards became prof. of architecture at the Polytechnic, and built the chapels of Sainte-Pélagie and Saint-Lazare, and the court of justice at Lyons. His numerous engravings, however, including 'Paris et ses monuments', 1803, are the main source of his fame.

Baltazarini (?-c. 1587). It. musician, first violinist of his time and founder of the modern ballet. His real name was Baldassaro da Belgioioso; he went to France and became first *valet-de-chambre* to Catherine de' Medici (1555) and led

his royal mistress's string band—gallicising his name to Balthazar de Beaujoyeux. He introduced It. dances to Paris. *D. c.* 1587.

Balthazar, or **Balthasar**, Gk form of the name Belshazzar (q.v.).

Baltic, **Battle of the**, sea-fight which took place off Copenhagen on 2 April 1801. In this battle Parker and Nelson destroyed the Dan. fleet.

Baltic Exchange, St Mary Axe, London, E.C., the members of which are produce merchants and brokers, shipowners, shipbrokers, etc. The B. E. originated in meetings of the 18th-cent. merchants interested in the Baltic trade in the Baltic Coffee House, and now concerned with trading in all parts of the world. It was purely mercantile until fusion with the London Shipping Exchange in 1899.

Baltic Provinces, name used before 1917 for the 3 provs. of the Russian Empire, Estland, Livland, and Kurland (qq.v.), which had belonged to the Teutonic Knights, later to Sweden and Poland, and were annexed to Russia in the 18th cent. The majority of the pop. were Estonians and Latvians, but the political and largely the economic power, as well as cultural influence, were concentrated in the hands of the Ger. minority. Russification measures (Russian language in administration and at Dorpat Univ.) dating from the 1880's were primarily aimed at undermining this preponderance of the Ger. upper classes. In 1918-19 the B. P. formed parts of the new independent states of Estonia and Latvia (qq.v.). See also **BALTIC STATES**.

Baltic Sea, sea between 54° and 66° N. lat. and 9° and 30° E. long. It is surrounded by the dominions of Sweden, Russia, Germany, and Denmark. It is 960 m. long and 400 m. broad. It has 5000 m. of coastline. A channel connects it to the N. Sea. The W. portion of this channel is called the Skagerrak, while the remainder is called the Cattegat. Is. all the S. extremity of the Cattegat, and communication is continued by narrow straits called the Sound, the Great Belt, and Little Belt. Its total area is 166,397 sq. m. The separating factor between the B. S. and the N. Sea is a plateau upon which the is. Zealand, Fünen, and Laaland are situated. Its depth has been computed to be 36 ft., which falls considerably lower than that of any other inlet of the sea of similar character. The bed of the B. S. in the deeper parts is generally of soft brown or grey mud, or else of hard clay. Near the low coasts and on the shallower banks fine sand with small pebbles are seen.

Its navigation is rendered dangerous by shallowness, narrowness, and sudden changes of wind followed quickly by storms. It runs eastward into three gulfs, Gulf of Bothnia, the northernmost, Gulf of Finland, and Gulf of Riga. There is not such a quantity of salt in the B. S. as in other oceans, and the water therefore is clearer on that account. From 3 to 5 months of the year access through the sea is hindered by ice, but the whole surface is seldom frozen entirely, though

records of that event have been estab. in the years 1658 and 1809. It possesses the characteristic of all inland seas that it is little affected by tides. The perceptible rise and fall of its waters are due more to the variations in the water-bulk of its rivs. than to any tidal circumstances. Of the rivs. that discharge their waters into this sea there are 250, resulting in a drainage of almost one-fifth of the area of Europe. The most important of these are the Oder, Vistula, Niemen, Dvina, Narva, Neva, while the chief of the is. are Zealand, Fünen, Bornholm, Stamsöe, and Laaland (Denmark); Gottland, Oland, and Hveen (Sweden); the Aaland Is. (Finland), and Rügen (Germany). The prin. exports from its bordering countries are timber, furs, tallow, and grain. Amber is cast upon its shores in stormy weather. The canals connecting the B. S. with the N. Sea are the Kiel, which cost £8,000,000, and which proved an immense advantage to Germany; the Elder Canal, and the Gotha Canal. The chief harbours in the Baltic are Copenhagen (Denmark); Kiel, Lübeck, Stralsund (Germany); Szczecin (Stettin) and Gdansk (Danzig) (Poland); Kaliningrad (Königsberg) and Klaipeda (Memel) (Lithuania); Riga (Latvia); Narva (Estonia); Kronstadt (R.S.F.S.R.); Sveaborg (Finland); and Stockholm and Karlskrona (Sweden).

Baltic States, name commonly given to the 3 independent states, Estonia, Latvia, and Lithuania, which were formed after the First World War out of ters. of the former Russian Empire inhabited by Estonians, Latvians, and Lithuanians. Soviet Russia recognised their independence in peace treaties signed in 1920, but in 1939 the Soviet Gov. forced them to concede occupation of important military bases by Soviet troops, and in 1940 they were completely occupied, annexed, and transformed into constituent reps. of the Soviet Union. For appearance' sake Soviet style elections were held and the new parliaments unanimously resolved to ask for admission into the Soviet Union, which was duly granted. The ensuing terror and deportations caused large sections of the pop., despite their traditional anti-Ger. attitude, to welcome Ger. troops as liberators in 1941. Under Ger. occupation they, together with Belorussia, were included in the Reich Commissariat 'Ostland.' With the advance of the Soviet Army in 1944 many inhab. fled to W. Europe (Sweden, Germany). Sev. countries, including Britain, have not recognised the incorporation of the B. S. into the U.S.S.R. and continue to recognise their accredited diplomatic representatives. See F. W. Pick, *The Baltic Nations*, 1945, and J. A. Swettenham, *The Tragedy of the Baltic States*, 1952.

Baltic-White Sea Canal, see **WHITE SEA-BALTIC CANAL**.

Baltimore: 1. Port and the largest city of Maryland, U.S.A. It is in pop. the sixth largest city of the U.S.A., and is situated at the head of the R. Patapsco, an inlet from Chesapeake Bay. It is 210 m. distant from the ocean by canal.

Its environment is pleasing, and its site is of varied altitudes. It owes a great deal of its importance to its safe harbour, whose minimum depth is 24 ft. and it has direct communication with the prin. ports on both sides of the Atlantic. Over 100 steamship lines enter the port, which is one of the best on the Atlantic coast. Many railways converge at B., and it is served by Friendship International Airport. A great trade in bread-stuffs is carried on, while among further articles of export are tobacco, provisions, coal, cotton, naval stores, canned fruit, and oysters. The chief articles imported are guano, coffee, other tropical products, fertilisers, iron, steel, tin-plate, and chemicals. Besides its great shipping trade, B. has extensive industries including smelting and refining copper, tractors, motor vehicles, tin cans and other tin-ware, refining sugar and petroleum, slaughtering and meat-packing, printing and publishing, and the making of clothing, textiles, pharmaceuticals, fertilisers, glass products, soap, lumber, scientific instruments, electric tools, and aircraft. The canning of oysters forms one of the chief industries of B., and many thousands of vessels are engaged in their quest. The splendid appearance of many of its buildings has made additional fame for the tn; among these buildings the most notable are the chamber of commerce, the Rom. Catholic cathedral, the custom-house, the Maryland Institute, and the Peabody Institute. In Feb. 1904 the greater part of the business quarter was destroyed by fire. In 1920 the city area was nearly trebled by the inclusion of the adjacent dists., and its water-front was much enlarged.

There are five noteworthy public monuments, the chief being that of Washington, a column 210 ft high. The fineness of these erections has caused B. to be called the monumental city. The most famous of its many beautiful parks is the Druid's Hill Park of nearly 700 ac. in extent. Since the first decade of the present cent. great improvements have been carried out in B.; cobbled streets have been converted into smooth-paved ones, and new water and sewage systems have been installed. There are approximately 200 churches, conspicuous among which are the Rom. Catholic, Protestant, Episcopal, and Methodist. One of the first seats of learning in the country is the Johns Hopkins Univ. (q.v.). It was opened in 1876. Other educational centres are the B. city college, the academy of science, the law school, St Mary's Univ., and Loyola College. The Enoch Pratt library contains over 350,000 books. In addition to its main building it has 26 branches. As a social centre and a tn famous for its enthusiasm for art, B. is specially to be noted. It is the see of an Anglican bishop and a Rom. Catholic archbishop, who acts as primate of U.S.A. Dr John Carroll was the first archbishop. The pop. includes a large element of Ger. descent, with Irish and Fr. creole families. Negroes number over 100,000. In the days when B. was a

colony, the Puritans and Scottish-Irish Presbyterians were in great numbers. The city was founded in 1729 in honour of Lord B., who estab. Maryland colony. During the wars of 1812-15 it became the scene of many engagements. Pop. (1950) 949,708.

2. A fishing vil. in co. Cork, Rep. of I., on B. Bay, 8 in. from Skibbereen.

Baltimore Bird, or **Oriole** (*Icterus galbula*). It is very common all over N. America, and is something like a finch, measuring about 7 in. from the tip of its long, sharp beak to the end of its rounded tail. The beak is conical and longer than the head, and the wings long and pointed. The males come N. early in May, preceding the females by a few days. They choose a spot preferably near houses, and build a beautiful hanging nest, from 6 to 7 in. long, in a tulip-tree or pea-vine, taking their materials from moss patches, cattle hairs, or fibres. Their plumage, especially of the males, is very gay, glossy black, orange, and vermilion. Orange and vermilion were the colours of the livery of Lord Baltimore, whence the name. It is also called fire-bird from its bright plumage, and hang-nest from its method of building. The B. B. has a strong and sweet song particularly pleasing during its mating season, and is gregarious in its habits. Although it does much damage among the fruit, it rids the orchards of such insects as the canker-worm and tent-caterpillar. See Baird, Brewer, and Ridgway, *N. American Birds*.

Baltimore, George Calvert, 1st Baron (c. 1580-1632), statesman, founder of the state of Maryland, U.S.A. *b. Kipling*, Yorks, and educ. at Trinity College, Oxford. From 1619 he was secretary of state, but in 1625 he became a Catholic, resigned his office, and acquired his title with large estates in Ireland. He estab. a settlement at Newfoundland in 1621, and attempted a similar settlement in Virginia, but *d.* before the charter was completed. It passed to his son, the 2nd Baron B.

Baltinglass, mrrkt tn, 30 m. W. by S. of Wicklow, Rep. of I. It has fine eccles. remains, and is close to the Glen of Imaal. H.Q. of the '98 guerrilla chief, Michael Dwyer. Pop. 2000.

Baltistan, otherwise **Little Tibet**, mountainous region of Kashmir below the Karakoram Mts on their S. side. Its mean elevation is 11,000 ft. The Upper Indus flows through the region, which contains the largest glacier in the world outside the Arctic. The inhab. numbering 52,000, are Muslims of Tibetan origin.

Baltiysk, see **PILLAU**.

Baluchistan (**Beluchistan**), vague geographical term applied to a large area comprising the S.E. corner of Persia and the N.W. of Pakistan. 1. **Persian B.**, prov. of Persia, bounded on the N. by Sistan, E. by Kalat, W. by Shagird, and S. by the Sea of Oman. It is a barren, sparsely populated area with a hot climate. In the centre of the prov. is the volcanic mt. Kuh-i Taftan (9500 ft). Zahedan is the main tn. Pop. c. 300,000.

Formerly separate, it is now part of the 8th Ustan (*see* PERSIA).

2. A prov. of Pakistan bounded on the W. by Persia, on the NW. by Afghanistan, and on the S. by the Arabian Sea. It has a total area of 134,002 sq. m. and a pop. (1951) of about 1,174,036. It is composed of 5 dists. (Quetta-Pishin, Sibi, Zhob, Loralai, Chagai) and 4 states (Kalat, Las-Bela, Kharan, Mekran). The chief tn is Quetta with a pop. (1951) of 84,343. The pop. is mainly Muslim (1,137,063), composed of Baluchis, Sindhis, and Pathans, with a sprinkling (approximately 13,000) of Hindus and a few

Baluchitherium, giant hornless Oligocene rhinoceros, probably the largest known land mammal. Its limbs were long and massive, the skull about 4 ft in length, and it stood about 18 ft high at the shoulders.

Balus, Jean de la (1421-91), Fr. cardinal and minister of Louis XI. He became chaplain to the king, comptroller of finances, secretary of state, Bishop of Evreux, 1464; Bishop of Angers, 1467; and cardinal, 1483. He intrigued with the Duke of Burgundy, Charles the Bold, against Louis, for which he was imprisoned in an iron cage in the castle of



BALUCHISTAN: THE BOLAN PASS

E.N.A.

Christians and others. The prov. consists largely of barren mts, deserts, and stony plains and the climate is subject to extremes of heat and cold. Rainfall is scanty and uncertain. Agric. products include wheat, barley, millet, lucerne, rice, maize, and potatoes. Coal is mined at Sharigh and Harnal on the Quetta-Pishin railway, and there are important chrome mines near Hindubagh in the Zhob dist. The NW. railway bifurcates at Sibi, one branch to Khost (83 m.) and the other via Quetta to Chaman (271 m.). From Spezand, 16 m. S. of Quetta, there is a line to Zahidan (440 m.) in Persia. A metre gauge line runs from Quetta to Fort Sandeman (184 m.). *See* G. P. Tate, *The Frontiers of Baluchistan*, 1909; T. H. Holkitch, *The Indian Borderland*, 1909; D. Bray, *Ethnographic Survey of Baluchistan*, 1913; Sir M. Aurel Stein, *Archaeological Tour in Waziristan and N. Baluchistan*, 1929.

Onzain, 1469. He was, however, released in 1480, and went to Rome.

Baluster, or **Banister** (from Gk *balaustion*, flower of the pomegranate), name given to pillars or shafts supporting a cornice, coping, or the handrail of a staircase. The pear-shaped swelling at the lower end of the pillar accounts for the origin of the name.

Balustrade, range of equidistant balusters, together with the cornice, coping, or handrail they support. They are used as parapets or to enclose stairs, and may be decorated with various devices.

Baluze, Etienne (1630-1718), Fr. historian. He was bursar at the univ. of Toulouse, 1646-54, and afterwards acted as librarian to Le Tellier and the Archbishop of Auch, obtaining, in 1667, a similar post with Colbert, which he held until 1700. In 1707 he was appointed inspector of the Royal College of France. His chief works are *Capitularia Regum*

Francorum, 1677, *Miscellanea*, 1678-1715, *Nova Collectio Conciliorum*, 1683, *Vitae Paparum Avenionensium*, 1693, *Historiae Tutelensis Libri III*, 1717. On account of his *Histoire généalogique de la maison d'Auvergne*, 1708, B. was exiled in 1710, but was recalled to Paris in 1713.

Balzac, Honoré de (1799-1850), Fr. novelist, b. at Tours, of a well-to-do bourgeois family. From 1806 to 1813 he attended the Collège de Vendôme, and for the following 3 years the Collège de Tours, but he showed no aptitude for study, though he must have read widely in his early youth. Much of his school life is reflected in the pages of *Louis*

which are written in a Rabelaisian vein, and must be classed separately from his novels: *La Maison du chat qui pelote*, 1830; *La Femme de trente ans*, 1831; *La Peau de chagrin*, 1831; *Le Chef-d'œuvre inconnu*, 1831; *Eugénie Grandet*, 1833; *Le Père Goriot*, 1834; *La Recherche de l'absolu*, 1834; *Les Illusions perdues*, 1834; *La Cousine Bette*, 1846.

B. conceived the idea of uniting his various pieces into one mighty whole, under the title *La Comédie humaine*, which should comprise all the multifarious aspects of life—*scènes de la vie parisienne*, *de la vie militaire*, *de la vie privée*, and so on. This vast scheme was not completed.

In Paris he made numerous friends, including Victor Hugo, Vigny, George Sand, and Lamartine. He fell in love with a Polish lady, Mme Hanska, who was his ideal to the end of his life. Though her husband d. in 1840, debts and other causes prevented B. from marrying her till a few months before his death. He was buried in Paris on 29 Aug. 1850, the pall-bearers being Dumas, Hugo, Baroche, and Sainte-Beuve. Hugo delivered the funeral oration.

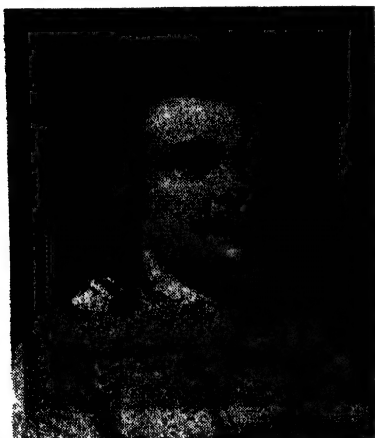
B.'s genius is undeniable. He flashed on all the little, unnoticed things the lurid light of his imagination, and therefore he has been called both a realist and a romanticist, according to the point of view of the reader. Nothing escaped his notice, and in the remorseless handling of his material he has been accused of exposing the sordid, unhealthy side of life. But it cannot be doubted that his aim was moral, in the widest sense of that term. His stage is so vast, his persons so true to life, that as a creative genius he stands among the greatest writers of all time.

See Everyman's Library (trans. of 15 of the best-known novels); A. le Breton, *Balzac, l'homme et l'œuvre*, 1905; J. M. Burton, *Honoré de Balzac and his Figures of Speech*, 1921; W. H. Royce, *A Balzac Bibliography*, 1929; P. Bertault, *Balzac, l'homme et l'œuvre*, 1946; S. Zweig, *Balzac*, trans. 1947.

Balzac, Jean Louis Guez de (1597-1654), Fr. essay-writer, b. Angoulême. He went to Italy with Cardinal de la Valette, and was struck by the rich smoothness of the It. style as compared with that of his own country. His writings mark the beginning of polish and elaboration, before unknown in Fr. composition. His *Letters* were pub. in 1624; *Le Prince*, 1631; *Discours*, 1644; *Le Barbon*, 1648; *Le Socrate chrétien*, 1652; *Aristippe*, 1658. He became a member of the Fr. Academy in 1634, and was a friend of Richelieu. His collected works were pub. in 2 vols. (1665).

Balze, Jean Etienne Paul (1815-84), Fr. artist, b. Rome, and made his début at the Salon in 1835 with a painting from Scott's *Lady of the Lake*. He painted murals in the palace of the senate representing the scientific, agric., and industrial discoverers of the 19th cent.

Balzico, Alfonso (1825-99), It. sculptor, b. Cava di Tirreni, near Salerno. He studied at the academy of Naples and at



French Embassy

PORTRAIT OF BALZAC BY LOUIS BOULANGER

Lambert (1832). His father put him to study law at the Sorbonne, but B. kicked over the traces, refused to practise, and in 1819 went to Paris, confident of his real vocation. From 1820 to 1829 he tried his hand at tragedy and at novel writing, but made little progress in either. It was a period of hard work and privation. In 1825 he started business as a publisher, printer, and type-founder—a speculation which entailed debts that harassed him almost to the end of his life. The publication of *Les Chouans* in 1829 marks the beginning of his literary career. Though it has been termed melodramatic, it is superior to his previous work, giving a brightly coloured picture of Brittany in 1799. The imitation of Scott is obvious.

From 1829 B. worked with untiring energy. In 20 years he produced 85 novels, in addition to his dramatic attempts, articles to the newspapers, miscellaneous minor works, and a lengthy correspondence, addressed chiefly to his sister Laure and her friend Mme Zulma Carrand. Some of his best-known works may be mentioned: *Les Contes drolatiques*,

Rome, where he executed the colossal statue of John the Baptist. 'Cleopatra,' 'The Coquette,' 'Revenge,' and 'The Tree' were executed by special request of King Victor Emmanuel. His other works include 'Massimo d'Azeglio,' 1873, 'Duke Ferdinand of Genoa,' both at Turin, and 'Victor Emmanuel,' 1897, at Naples.

Bam, dist. and tn of Persia, situated on the SE. borders of the Great Desert. It formerly contained a celebrated castle, the ruins of which are still to be seen. Pop. of tn, 13,500.

Bamangwato, African tribe, of the Bantu race, and the largest tribe of the Bechuanaland Protectorate, numbering over 100,000. See BECHUANALAND and SERETSE KHAMA.

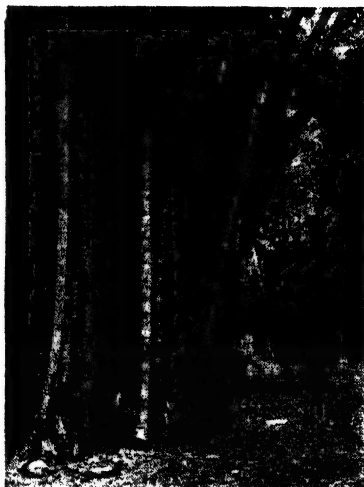
Bambarra, or **Bambara**, name sometimes given to a dist. of W. Africa, in the colony of Fr. Sudan (until 1920 known as Upper Senegal and Niger), the name being that of the Negro tribe that inhabits the area. Segou (pop. 8229) is the cap. of the dist.; Sansandig, on the Niger, was once an important trading centre. The dist. is fertile. See SUDAN, FRENCH.

Bamberg, Ger. tn in the *Land* of Bavaria (q.v.), 125 m. N. by W. of Munich (q.v.), on the Regnitz near its junction with the Main (q.v.). It was ruled by prince-bishops from 1007 (when its bishopric was founded by the Emperor Henry II (q.v.), until 1802. In 1460 one of the first books in the Ger. language was printed here. During the Thirty Years War (q.v.) the tn suffered at the hands of the Swedes, and during the Seven Years War (q.v.) at the hands of the Prussians. There is a splendid Romanesque and Gothic cathedral (1004-1237), containing the famous 13th-cent. statue of the 'B. Rider,' and containing also the tombs of Henry II and of Pope Clement II (q.v.). Among the sev. other anct churches is the baroque *Michaeliskirche*, once a celebrated Benedictine abbey. The Renaissance Old Palace, and the baroque New Palace are both now museums. Textiles, tobacco, and electrical components (spark-plugs) are manuf. Pop. 80,000.

Bamberger, Ludwig (1823-99), Ger. politician and economist, b. Mainz, of Jewish parentage, studied law at Giessen, Heidelberg, and Göttingen. He took part in the revolutionary movement at the time when he was editing the *Mainzer Zeitung* (1848-9) and afterwards lived in exile in France for sev. years. He was a member of the National Liberal party in the Ger. Reichstag (1871-80). He was a free-trader and opposed the economic policy of Bismarck. With other Liberals he seceded from the party, forming a group of 'Secessionists,' the later Liberal union which opposed the colonial policy of the Gov. His books include a life of Bismarck, 1868, and *Reminiscences*, 1899.

Bambino (It., babe), term in art applied to the swaddled figure of the infant Christ, and particularly to the Santissimo B. in the church of Ara Coeli, Rome, which is supposed to have miraculous healing power. It is a richly decorated figure carved in wood. The festival of the B. takes place at Epiphany.

Bamboccio, Pieter van Laer (1613-c. 1673), Dutch artist, b. Laer, Holland. Studied at Rome. He neglected classical art but delighted in fairs, rustic parties, banditti, etc., subjects which the Italians comprise under the general name *bambocciati*. Hence his name, B., not, as some have said, owing to the deformity of his person.



Paul Popper

GIANT BAMBOOS, CEYLON

Bamboo (*Bambusa*), genus of Gramineae which grows in the tropics of Asia, Africa, and America. The plants are in reality gigantic grasses with a jointed subterranean rhizome, which is the true trunk of the B., the shoots being the branches. The stems are hollow and contain only a light pith, but they are jointed and at the nodes strong partitions stretch across the inside. The B.s grow in clumps, and may reach a height of 120 ft and a thickness of 10 in. The young plants for the first few years produce a well-stored rhizome, but when once they begin to increase in height their growth is very rapid. Some species flower only once, some every year, and others at longer intervals.

The B. is noted for its great economic importance, and serves a variety of useful purposes. The young shoots of some species are cut when tender and eaten like asparagus; the seeds also are sometimes used as food, and for making beer; some species exude a saccharine juice at the nodes which is of domestic value; the rhizomes and shoots, when pickled, form a condiment; silica, found in the stems of *B. arundinacea*, is used in E. medicine. The hard stems are converted into bows, arrows, quivers, lance shafts, masts of

vessels, bed-posts, walking-sticks, poles of palanquins, rustic bridges, beehives, water-pipes, gutters, furniture, ladders, domestic utensils, and agric. implements. Split up finely they afford a most durable material for weaving into mats, baskets, window blinds, ropes, and even sails of boats. Perhaps the greatest use to which they are put is in building, for in India, China, Japan, Assam, Malay, and other countries of the E., houses are frequently constructed solely of this material.

Bambuk, country in W. Africa, formed by the angle between the R. Senegal and its trib. Falemé. The climate is unhealthy, but the soil is rich and remarkable for its fertility. The vegetation consists of tamarind, baobab, calabash, acacias, and palm-trees. Maize, rice, millet, cotton, and water-melons are cultivated. The country is rich in iron-ore and there is some alluvial gold in the R. Falemé. The pop., estimated at 800,000, consists of Mandingoes, professedly Muslims. The B. country belonged to the Portuguese in the 15th cent., and was recognised as part of the Fr. Sudan in 1858. The chief tns are Kayes, Faranaba, and Mardinka.

Bamburgh Castle, in the vil. of B., on the coast of Northumberland, 16½ m. SE. of Berwick. According to the A.-S. Chronicle it was first built by Ida, first King of Northumbria, in 547, and called Bebbanburgh after Bebb, the wife of his grandson Ethelfrith. It has massive strength and dignity, rising high out of a rock 150 ft above the sea. The present castle mainly belongs to the Norman period, and has a fine keep and an apsidal chapel dedicated to St Peter. The castle was attacked by Penda, King of Mercia, in 651, and was twice taken by Dan. invaders. In 1095 Robert de Mowbray surrendered the castle to William Rufus. During the Wars of the Roses it was twice taken by the Yorkists and twice recaptured by Margaret. Elizabeth appointed Sir John Forster to be its governor, and the castle remained in the possession of his family until 1704 when the Forster estates were sold to Lord Crewe. The restoration of the castle was carried out under the direction of Rev. Dr John Sharpe, one of the trustees under the will of Lord Crewe, and from this time onwards the proceeds from the castle went to charitable purposes till in 1894 it was bought by Lord Armstrong for almshouses. B. was a royal borough in the time of Edward I, and returned 2 members to Parliament. Grace Darling's (q.v.) grave is in the churchyard.

Bambusa, see BAMBOO.

Bamian, valley in Afghanistan, 50 m. NW. of Kabul, near the N. base of the Koh-i-Baba Mts. The B. or Hajikhak Pass, at an elevation of 8496 ft on the road from Kabul, is the only known pass for military purposes over the Hindu Kush, and was once crossed by Alexander the Great. There are a number of cells hewn in the rock, and carved human figures of enormous size. The largest figure stands 173 ft high. These remains seem to indicate that the place was once

a centre of Buddhist worship. There are tombs belonging to the old city Ghulghuleh, which was destroyed in 1221 by the Mongols under Genghis Khan.

Bampton, mkt tn in Devon, England, 6 m. N. of Tiverton. There is a monthly market, and a fair held on the last Thursday in Oct. at which Exmoor ponies are sold. Pop. 1300.

Bampton, John (1690-1751), Eng. divine and the founder of the B. Lectures (q.v.). He graduated from Trinity College, Oxford, 1709. He held a preferment in Salisbury Cathedral from 1718 till his death.

Bampton Lectures, course of 8 divinity lecture sermons, called after their founder, Canon John B. (q.v.), who left an estate of £120 for their endowment. They are preached in alternate years at Great St Mary's, Oxford, and 30 copies are pub. within 2 months of their being preached, at the expense of the estate. The lecture is chosen on the fourth Tuesday in Easter term by the heads of colleges, and the lecturer must be an M.A. of Oxford or Cambridge, and cannot be chosen twice. The lectures must be based 'upon the divine authority of the holy Scriptures—upon the authority of the writings of the primitive Fathers as to the Faith and Practice of the Primitive Church—upon the Divinity of our Lord and Saviour Jesus Christ—upon the Divinity of the Holy Ghost—upon the articles of the Christian Faith, as comprehended in the Apostles' and Nicene Creeds.'

Ban, word found in many European languages, in various senses. The idea of pub. or proclamation runs through them all, showing that it is the anct word B. still preserved in Gaelic and Welsh, with the sense of proclaiming. It occurs in Spenser, Marlowe, and Shakespeare. On the foundation of churches and monasteries, writings were drawn up specifying with what lands the founders and other benefactors endowed them; as these frequently concluded with curses which would fall on anyone who should attempt to divert the lands from the purposes for which they were bestowed, the word has come to be associated with cursing. Hence the common use of the term. Persons who escaped from justice or opposed the church were placed under a B. (see BANISHMENT). A similar word was used in Germany with the sense of outlawry. In France a proclamation to call the people to arms was called a B., and those people liable to be called out came under the same name, so we have the *banlieue* of a city, and hence the modern use of the word. The French also use the word in the sense of the Eng. word bans (q.v.), under MARRIAGE.

Ban, Banus, from the Slavonian *ban*, a chief, the name given to a governor of certain dists. in the kingdom of Hungary, Dalmatia, Croatia, Slavonia, Bosnia, and Szórény. His power was unlimited, like that of a margrave, and he took command in time of war for the defence of his banat. In 1849 the B.s of Croatia, Slavonia, and Dalmatia were declared independent of Hungary and received their orders from

Vienna. In the year 1867 these banats were reincorporated with Hungary, and one of the Hungarian ministers was appointed B. of Croatia, Slavonia, and Dalmatia by the king under the direction of the president of the council and the Hungarian ministers. See BANAT.

Banagher, mrkt tn on the R. Shannon in co. Offaly, Rep. of Ireland. Anthony Trollope, while post office surveyor, wrote his first novels there, and Charlotte Brontë's husband, Rev. A. B. Nicholls, d. and was buried at B. Pop. 800.

Banam, tn in prov. of Prey Veng, Cambodia, on l. b. of R. Mekong (q.v.) at its junction with the Tonle-toch.



BANANAS

Banana, or **Plantain**, family Musaceae, genus (*Musa*) of about 40 species of very large, tree-like, tropical herbs. The edible B.s. of commerce are chiefly varieties of the subspecies *sapientum* of *Musa paradisiaca*, cultivated in tropical countries, especially Jamaica, Mexico, Honduras, Brazil, Guatemala, Colombia, and W. Indies; and *M. cavendishii*, the Canary B., much grown in Canary Isles, Florida, and Caribbean countries. The plants may grow from 5 to 25 ft tall, with a tree-like stem producing a bunch of very large, oblong or elliptic leaves of palm-like appearance at the apex, out of the centre of which arises a spike of flowers, eventually bearing the fruits which are long, seedless berries, and much valued as food. The Plantain of the tropics, which requires to be cooked, is produced by *M. paradisiaca*. *M. textilis* of the Philippines is the source of Abaca or

Manila hemp, and *M. ensata*, the Abyssinian B., is also grown for its fibres. Together with *M. basjoo*, the Jap. B., and the Chinese *M. superba*, *M. ensata* is grown as an ornamental plant in greenhouses, and sometimes out of doors in very mild gardens in Britain.

Banaras, see BENARES.

Banat, in general, a region governed by a *ban* (Slavonic title for ruler of a dist. with certain military powers); more particularly applied to a dist. lying between the Transylvanian Alps and the Danube, Tisza, and Mureș riva. The region belonged to Hungary, except for a short period (1849-60) when it was under the Austrian crown, and was divided by the treaty of Trianon (1920) between Rumania and Yugoslavia.

Banbridge, tn in co. Down, N. Ireland, on the Bann, 22 m. SW. of Belfast. Its prin. manuf. is linen. Pop. 6100.

Banbury, tn in Oxon, England, on the Cherwell and the Oxford Canal, 23 m. N. of Oxford. The Yorkists were defeated in the neighbourhood in 1469. The old castle, built in 1125, was destroyed during the Civil war, when B. was noted for its Puritanic zeal. The term 'B. man' came to be used as an equivalent for a typical Puritan. B. Cross, of nursery rhyme fame, existed down to the time of Queen Elizabeth, and has now been replaced by a modern one. The tn is still noted for its cake; the prin. industries are live-stock and aluminium. Pop. 19,000.

Banc, legal term for a seat or bench of justice. 'Sittings in B' or 'in banco' were formerly held at Westminster before two or more judges of the king's bench and exchequer and the court of common pleas. By the Judicature Act of 1873 two or more judges of the king's bench or probate div. of the High Court, sitting together 'in B.' for the purpose of trying issues of fact, are called a divisional court.

Banchieri, **Adriano** (1568-1634), lt. composer. b. and d. Bologna, became a priest and organist at Monte Oliveto in 1596, returning there after holding a similar post at Imola in 1601-7. But his church music is by no means the largest part of his output, which also includes secular canzonets, instrumental music, over a dozen theoretical works, and about as many stage works. Historically he is most important as an exponent of the madrigal opera, though none of his became as famous as the *Amfiparnaso* of Orazio Vecchi (q.v.).

Banchory, small burgh in Kincardineshire, Scotland, 17 m. WSW. of Aberdeen, on the Dee. Pop. 2000.

Bancroft, **George** (1800-91), Amer. historian, diplomat, and statesman. He graduated from Harvard College at the age of 17, studied hist. in Göttingen, where he received a degree of doctor of philosophy, and on his return to America in 1820 became Gk tutor at his own college. In conjunction with Dr Joseph Cogswell he estab. a school at Northampton, with which he was connected till 1830, when he devoted himself wholly to historical studies. He was made collector of the port of Boston in 1837, by President

Van Buren. As secretary of the navy he had a seat in the Cabinet of President Polk, 1845. Appointed minister to Great Britain, 1846-9, minister to Prussia, 1867-74. He was a Democrat, and his historical work, written at the time of the Civil war, was influential in inspiring an ideal conception of liberty. The first vol. of the *History of the United States* appeared in 1834, the tenth and last in 1874. He revised and added to the work, bringing out an ed. known as 'The author's Last Revision,' in 1883-5. His miscellaneous pubs.: *Poems*, 1823; *An Oration* (in memory of Andrew Jackson), 1845; *Martin Van Buren*, 1889.

Bancroft, Hubert Howe (1832-1918), Amer. historian, b. at Granville, Ohio, 5 May. He opened a bookshop at San Francisco in 1852, and made a large fortune, which he devoted to collecting documents—chiefly about Amer. hist.—and forming a fine library. His own contributions to historical literature include *The Native Races of the Pacific States*, *The History of the Pacific States*, and *Essays*, a total of 39 vols., appearing from 1875 to 1890. He also wrote *The New Pacific*, 1900, and *Retrospection, Political and Personal*, 1910.

Bancroft, Richard (1544-1610), prelate, b. Farnworth, Lancs. He was sent, at the expense of his great-uncle, Hugh Corroen or Curwen, Archbishop of Dublin, to Cambridge. In 1576 he became rector of Teversham, near Cambridge, and rose rapidly to the bishopric of London in 1597. He became Archbishop of Canterbury in 1604, and chancellor of Oxford Univ. in 1608. In the reign of James I he was appointed commissioner on behalf of the Church of England in the Hampton Court conference. He opposed Puritanism, and was a supporter of the theory of the divine origin of episcopacy. He was the founder of the Library at Lambeth Palace.

Bancroft, Sir Squire (1841-1926), actor-manager, b. in London. His first appearance on the stage was at the Theatre Royal, Birmingham, as Lt. Manley in *St Mary's Eve*. In 1865 he appeared in London at the Prince of Wales's Theatre as the leading actor, under the management of H. J. Byron and Marie Effie Wilton. Two years later he married Miss Wilton and continued with her the management of the Prince of Wales's till 1880, when they moved to the Haymarket. They retired from management together in 1885. He was knighted in 1896. Collaborated with Lady B. in *Mr and Mrs Bancroft On and Off the Stage*, *Written by Themselves*, 1888, and was the author of the *Bancroft Recollections of Sixty Years*.

Band, linen appendage to the neck-cloth or collar as part of clerical, legal, or academic costume. Some derive it from the amice, others from the collar worn by laymen in the reign of James I. It still forms part of legal costume in England, but has been replaced in Scotland by the white tie, except for king's counsel. It is worn by ordained Presbyterian ministers as distinguished from licentiates.

Band, in architecture, the name given to a flat strip or fascia, encircling a building or continued along a wall, usually horizontally. Also used of a B. of foliage, quatrefoils, or bricks. Special varieties of B.s are indicated by the terms lintel course, frieze, platband, string course, and so on.

The B. of a shaft is the moulding which encircles clustered pillars of small shafts, characteristic of Gothic architecture, especially in the Early Eng. style.



BANDS

Band: 1. *Military, etc.* Military B.s are composed of wind instruments and percussion, but their composition is not uniform, varying in different countries and even in different regiments. The authorised Brit. military B. is flute, E \flat clarinet, oboe, 7 B \flat clarinets, E \flat and B \flat saxophones, bassoon, 2 horns, 3 cornets, 3 trombones, euphonium, 2 basses, 1 percussion; this is a B. of 25 performers for programme work. For a B. of 40 there would be added a piccolo, 5 B \flat clarinets, a bassoon, 2 horns, 3 cornets, 2 basses and 1 percussion. In 1956 the authorised maximum estab. of regimental B.s was 40 plus conductor, and from this number would be drawn the B. of 25. For marching the instrumentation is adjusted to the conditions. Light Infantry and Rifle regiments use bugles with the military B. at times, while some countries have been known to use bagpipes with it. In addition to the regimental military B. proper, Highland regiments have a marching B. of bagpipes, while other infantry regiments have fife and drums, bugle and drums. The brass B.—strictly so-called—is dealt with below. For cents. European armies have had their B.s which were used for making signals in battle and to give encouragement to the fighters. The idea of present-day B.s was introduced into Europe by the crusaders, who took it from the Saracens. In the 16th cent. B.s became uniform and the Eng. 'drum march' won continental fame. Modern B.s owe their inception to Frederick the Great, who used them as means to make army service popular. His B. in 1763 consisted of 2 oboes, 2 clarinets, 2 horns, and 2 bassoons. Within 15 months France, Austria, and England had adopted similar B.s. Coloured men were employed in Brit. B.s for many years as

drummers and to play the cymbals, 'jingling Johnnies,' and similar instruments. They ceased to be employed in 1843. In 1823 the War Office ordered all officers to contribute towards their B.s. Valve instruments were introduced in 1830. In 1857 the gov. instituted a Royal Military School of Music, at Kneller Hall, near Twickenham, which was at first supported partly by gov. and partly by the various Brit. regiments. In 1867 the War Office took over the entire expenses. This institution trains non-commissioned officers, recommended by their commanding officers, for the position of bandmaster, and also trains promising young instrumentalists from all Brit. regimental B.s.; potential bandmasters have a 3 years' course which includes every branch of music, and the others a one-year course on their instrument under a civilian prof. In past years regimental officers had to subscribe towards the upkeep of B.s., but the gov. now maintains all regimental B.s. completely. All line regiments have one B. on their estab., but certain other corps—Royal Artillery, Royal Engineers, Royal Tank Regiment, etc.—have 2 or more. Staff B.s., such as the Household Cavalry, Foot Guards, Royal Artillery, Royal Engineers, have more musicians than line regiments and are enabled to maintain an orchestra also. The R.N., Royal Marines, and R.A.F. have their own schools of music which supply musicians to their respective services in much the same way as does Kneller Hall. The duty of service B.s. is to play at parades, officers' mess, ceremonial functions, etc., and subject to military exigencies they may also accept civilian engagements. All service military B.s. are now pitched to conform with civilian orchestras, i.e. A = 439.

2. **Brass.** With the growth of the volunteer movement many volunteer B.s. were formed, which were organised as far as possible on the model of the army B.s. These disappeared when the old volunteer force was abolished. Practically all the infantry and such leading artillery units as the Honourable Artillery Company (H.A.C.) of the modern Territorial Army have their own B.s. The brass B. proper is a type of instrumental combination which is especially suitable for open-air performance and amateur cultivation. It is found throughout Europe and is particularly popular in the N. cos. of England, where numerous tns and dists. possess brass B.s. As a movement brass B.s. began early in the last cent., and at the beginning of the present cent. there were at least 5000 such B.s. in the U.K., exclusive of the Salvation Army B.s. As in the case of the military B. it is difficult to specify categorically the constituent instruments of a brass B., but generally they consist of members of the cornet and saxhorn family, together with trombones. A normal Brit. brass B. has 25 players, besides percussion. At one time every autumn the contest of the brass B.s. of Great Britain was a popular festival at the old Crystal Palace. The *Daily Herald* National Brass B. Festival is held annually at the Albert Hall, London, and the

century-old 'Open' Championship Festival at Belle Vue, Manchester.

3. **Dance.** The modern dance B. may vary in number from 3 to 20 or more players. In an average-sized combination of 7 performers the instruments may be piano, string bass, percussion, violin, saxophone, trumpet, and guitar. Most competent players can perform on two or more instruments (known as doubling), thus giving the B. a wider variety of effects. See also ORCHESTRA.

Band, Bund, or Bend, Persian word for a dike or an artificial embankment, is often met with as a component part of names in E. geography; e.g. in the name of the Persian dam Bandamir on the R. Kur, in Fars, so called after Amir Azud ud-Dawla.

Band-fish, marine fish of the family Cepolidae. It is elongated and has spiny rays. *Cepola rubescens*, the red B., is a Brit. species of vivid hue, and is about 15 in. long.

Band of Hope Movement, started in 1847 in Leeds with children's weekly temperance meetings, and organised itself into the U.K. B. of H. Union in 1855. The movement's work is interdenominational and has spread to many parts of the world. Its official organ is the *Band of Hope Chronicle*, and its H.Q. are at Hope House, Great Peter Street, London, SW1.

Band-pass Filter, network consisting of an inductance in series with a capacitor and with a second capacitor shunted by an inductance, all so dimensioned that oscillations of frequencies within 2 given limits are passed through on account of resonance with the network.

Banda Islands, group in the S. Moluccas, Banda Sea, Indonesia, about 50 m. S. of Ceram (area 40 sq. m.). They are volcanic in origin, with Gunung-Api, 2000 ft., still active. Agric. products include nutmeg, sago, mace, and coco-nut. There was a Portuguese settlement in the early 16th cent., but the settlers were expelled by the Dutch by 1580. Occupied by Japanese in Second World War, B. I. became part of Indonesia in 1950. Pop. 13,000, many the descendants of emancipated slaves.

Bandage, strip of muslin or other material, of varying widths and lengths, used by surgeons to support a part of the body or to restrict movement, to apply pressure in order to prevent bleeding or swelling, or to fix dressings or apparatus in their places. B.s. may be simple, when they consist of 1 piece, as the roller and triangular B.; or compound, when they consist of 2 or more pieces.

The *Roller B.* is usually a strip of calico, flannel, linen, or muslin, about 18 ft. in length and 2-4 in. in width. In bandaging a limb the turns commence at the extremity and proceed upwards, so that the blood is driven from the limb. Circular bandaging consists of taking circular turns around the part, each loop covering about two-thirds of the width of the loop previously applied. Oblique bandaging means making the loops at an oblique angle to the axis of the limb. As the arm and leg gradually increase in diameter from the extremity

upwards, simple, circular, or oblique bandaging would tend to bind the limb by the edge of the strip only, leaving portions of the skin too loosely bound. To remedy this the B. is occasionally reversed; that is, the strip is turned so that the surface previously in contact with the limb becomes the exterior surface, and vice versa. When a joint such as the knee or elbow has to be passed, the turns cross each other like a figure of 8. The 'spica,' also used for passing projections in the limb, is an arrangement resembling the overlapping of the husks in an ear of corn. When sufficient turns have been taken, the end of the B. may be split in two, one tail carried round the limb in a direction reverse to the turns and securely tied to the other tail; a better plan is to sew the end, or fasten it by a safety-pin, care being taken to pass the needle or pin through 2 or 3 previous loops, so that the whole may be held firmly together without undue pressure from any single loop. The fingers and toes should never be bandaged with 2 injured surfaces touching, as there would be considerable danger of adhesion. If the extremities of the toes or fingers are not involved in the injury, they should be left uncovered, as their appearance will indicate whether the circulation has been unduly interfered with, when the B. will have to be readjusted. Any inequalities of pressure may be remedied by the use of padding of cotton wool.

B.s of rubber fabric are used when considerable pressure is required, as in sprains or varicose veins. Martin's rubber B. is used to lend support in cases of varicose veins. It consists of a roller B. which is wound spirally about the leg while the patient is in a horizontal position. It should not be tight, and the necessity for reversing is obviated as the elasticity of the rubber tends to keep all parts of the B. in contact with the surface of the limb. Esmarch's B. is used to prevent hæmorrhage from a limb during amputation. It is wound spirally about the limb with considerable pressure, beginning at the extremity, so that the blood is driven from the limb as much as possible. When the B. has passed above the seat of the proposed operation, a thick piece of rubber is bound tightly round the limb so as to prevent the return of the blood and thus save it for the remainder of the body. Before the widespread use of anaesthetics such an arrangement was used not only to prevent hæmorrhage, but also to diminish pain.

The *Triangular B.* consists of a piece of thin calico made by cutting a sq. yd diagonally, 2 such B.s being thus provided. The 'broad B.' is made by bringing the right-angled 'point' to the 'centre' of the long side, and folding the trapezium thus formed once again. The 'narrow B.' is made by folding the broad B. yet again. The triangular B. is used chiefly in first-aid work, being adaptable to many different uses. To cover the top of the head for securing dressings on wounds, the centre should be placed between the eyebrows, the point allowed

to hang over to the back of the head, and the ends passed round to the back, crossing over the point and brought together again on the forehead, where they are secured by a reef knot; the point is then turned up and safety-pinned on the top of the head. A sling for fracture of the collar-bone or forearm is made by placing one end of the B. over the sound shoulder, the operator standing in front of the patient; the forearm of the injured part is then drawn across the chest so that the point of the B. is on a level with the elbow; the other end of the B. is brought in front of the arm and carried over the shoulder of the injured side, the 2 ends being tied behind the neck, but in such a position that the knot is not in the way of the patient when lying down; the point is then brought round the elbow and secured in front by a safety-pin. To B. the foot, the sole is placed on the B., the toes being directed to the point. The point is then brought up above the front of the ankle, the ends crossed over the instep, and the point passed under the foot and over again and tied behind the ankle. The triangular B. may also be made into a tourniquet by folding it very narrow and tying a knot to the middle. The knot is placed over the artery when the bleeding occurs in the upper arm or thigh; the ends are passed round the limb and tied tightly. Additional pressure may be imparted by pushing a thick pencil between the tourniquet and the limb and twisting it. In tying knots in B.s the reef knot must be used in preference to the granny knot; that is, after making one bend in the ordinary way, the second half should be tied in the reverse direction. See M. Farnworth, *Roller and Triangular Bandaging*, 1940, and L. Oakes, *Illustrations of Bandaging and First Aid*, 1942.

Bandaisan, volcano (height 5540 ft) situated in Fukushimaken, Japan. A great eruption occurred in 1889.

Bandanna, or **Bandana**, particular kind of silk or calico handkerchief on which has been printed a pattern made up of spots and diamonds. B. handkerchiefs were originally made in India, but are now manuf. in England. The handkerchief is first dyed one colour, and then placed between leaden plates, on which the pattern has been cut out, and put into a powerful Bramah press, when the colour is discharged by means of a bleaching liquid, and the spots are left white on the dyed background.

Bandar Abbas, dist. and tn on the N. shore of the Persian Gulf, belonging to the Kerman prov. in Persia. The tn is 12 m. NW. of the is. of Ormuz. It has port accommodation, and good anchorage for large vessels in 4-5 fathoms, about 2 m. of tn. Its trade is small. Under the name of Gombroon, it was seized and fortified by the Portuguese c. 1612, and retaken by the Persians in 1615, and made into the prin. port of Persia by Shah Abbas and given the name of Bandar Abbas. The English were allowed to build a factory in 1623, and the Dutch soon after received the same permission. The

old Dutch factory still stands. Pop. 11,000.

Bandar Gaz, port on the Caspian, Persia. Its importance has declined in recent years owing to the foundation of Bandar Shah and the recession of the sea.

Bandar Pahlavi, see PAHLAVI.

Bandar Shah, one of the prin. Caspian Sea ports of Persia (Iran) in the prov. of Gorgan, founded in 1927-8 as the terminus of the Trans-Iranian railway. Pop. 14,000.

Bandelrante (Portuguese *bandeira*, a flag). Name originally given to the 16th- and 17th-cent. slave-runners and colonisers of S. Brazil. They were active in the areas of the present states of São Paulo and Minas Gerais. The name is now used in a complimentary sense to describe a modern inhab. of the city and state of São Paulo.

Bandel, Joseph Ernst von (1800-76), Ger. sculptor, b. Ansbach in Bavaria. His chief work was a colossal statue of Arminius, at Detmold.

Bandello, Matteo (c. 1485-1561), It. writer, second only to Boccaccio (q.v.) as a story-teller. He was b. in Piedmont of good family, and early became a Dominican friar. In 1525 he left Italy after the battle of Pavia, and settled in France, where he became Bishop of Agen (1550) and d. there 11 years later. His *Novelle*, which number about 230, are one of the most important collections of the 16th cent., and provided themes for Shakespeare, Massinger, Byron, and others. There is a danger of dismissing B. too lightly on the grounds of prolixity, coarseness, and want of humour. But he was a born raconteur, with a flair for finding his own stories, even though he lacked the fecundity of invention and humanity of Boccaccio. A number of his tales are believed to have necessarily been either anecdotal or else founded on *crimes passionnels* committed at no great distance from his own circle of acquaintances. One obvious example is the story of the wicked Countess of Celano, and another the far more celebrated story of the Duchess of Malfi. The great majority are tales of trickery, often ending with a terrible scene of vengeance. B. is not lewd, though in his period it was the fashion to treat directly of certain aspects of a story which modern technique is content to leave implied. Critics may cavil at B.'s moral lessons, but his stories have a force which is more or less independent of technique. If often drawn out, B.'s style is simple and fluent, his narrative vivid and direct, his characterisation excellent and, above all, the movements of passion admirably represented. A tale which combines most of his merits is that of Anselmo and Angelica, a story of a gentleman of Siena and of the enemy whom he delivers from death. The well-known Eng. trans. of 13 'Tragical Discourses or Tales' is that of Sir Geoffrey Fenton, which first appeared in 1567; and it gave the impetus to that wholesale pillaging by which poets obtained the material for so many of their greatest pieces. Fenton, who resided in Paris,

seems to have chanced upon these popular stories from reading the rendering of Belleforest. His trans. is one of the most notable surviving specimens of that stream of It. trans. which filled the book-shops of the period. The latest ed., *Bandello: Tragic Tales. Translated by Geoffrey Fenton*, ed. by R. L. Douglas and H. Harris, was pub. in 1924. Wm Painter's *The Palace of Pleasure*, 1566, also contains trans. from B., either direct or from the French.

Bandera, Stepan, leader of the extreme nationalist Ukrainian organisation Ukrainian National League in Galicia (q.v.) before and during the Second World War. After the occupation of Lvov by the Germans in 1941 B.'s followers proclaimed an independent Ukrainian state and set up a gov., but were arrested by the Germans and sent to concentration camps in Germany. After the war the name *Bandorovites* came to be used for all militant Ukrainian nationalists in the W. Ukraine who carried on guerrilla warfare against the Soviet authorities.

Banderoles, or **Bannerol** (It. *banderuola*, little banner), narrow flag flown sometimes at the mast of a fighting ship or from the lance of a knight. The word was also used of a square banner-like flag carried at funerals and bearing the arms of the deceased's family lineage.

Bandicoot, name for the family of the Marsupials known as Peramelidae. They are all natives of Australasia, and none is larger than a hare. In the structure of the hind feet they resemble the kangaroo, but there is less disproportion between the limbs. They are all insectivorous, but sev. species are omnivorous. *Paragalia* are the rabbit B.s, *P. lagotis* being known as the native rabbit in W. Australia; *Perameles*, which are herbivorous, include *P. nasuta*, long-nosed B., and *P. myosuroides*, saddle-backed B.; *Chaeropus* are the pig-footed B.s.

Bandicoot Rat, species of *Nesokia*, its scientific name being *N. bandicota*. It is a rodent of the family Muridae, to which rats and mice belong. It is a native of the E., and its flesh is used as food in India and Ceylon.

Bandiera, Attilio (1811-44) and **Emilio** (1819-44), brothers of a Venetian family who led a rising against the Bourbon tyranny of Naples in favour of It. independence, 1843. The rising failed and they fled to Corfu. With about 20 comrades, they landed in Calabria, expecting that their arrival would be the signal for a revolt. However, they were betrayed by one of their companions and were shot, with 6 others, in the square of Cosenza, 25 July 1844.

Bandinelli, Baccio or **Bartolommeo** (c. 1489-1561), Florentine sculptor and painter, disciple of Leonardo da Vinci. According to Vasari, his affection for da Vinci and hatred for Michelangelo led him to destroy the famous cartoon of the latter, which was supposed to excel da Vinci's on the same subject. Amongst his best-known sculptures are a statue of St Peter, a fine copy of the Laocoön, 'Hercules slaying Cacus,' 'Bacchus and

Orpheus,' and 'Adam and Eve.' See Vasari's lives and Benvenuto Cellini's autobiography.

Banditti, see BRIGANDS.

Bandjermasin, see BANJERMASIN.

Bandong, or **Bandung**, tn of Java, 75 m. SE. of Jakarta. It is an industrial centre (quinine, textiles, chemicals, rubber goods, machinery) and has an Eng. college, textile institute, and Pasteur institute. Pop. 166,800.

Bandolier, also **Bandoleer** and **Bandileer**, broad leather belt worn over the shoulder, across the breast, and under the arm. As worn by the old musketeers, it had attached a bag for balls and a number of metal cases or pipes, each containing a charge of gunpowder. Later the B. was fitted with leather pockets for cartridges.

Bandoline, gummy perfumed substance, variously produced from quince seeds, gum tragacanth, and Irish or Iceland moss, used to impart glossiness and stiffness to the hair. It is usually scented with attar of roses or oil of bitter almonds.

Bandon, tn in co. Cork, Rep. of Ireland, 17 m. SW. of Cork on both banks of R. B. It has mineral water and milling industries, and is one of the tns founded by 1st Earl of Cork. Pop. 2600. The R. B., 40 m. long, rises in the Carberry Mts, near Dunmanway, and flows SE. into the harbour of Kinsdale. With its tribs. it is a very important centre for salmon and trout fishing.

Bandung, see BANDOENG.

Bandwidth, range of frequencies within two given limits.

Bandy, see ICE HOCKEY.

Baneberry, or **Herb Christopher** (*Actaea spicata*), family Ranunculaceae, a native of Europe. When mature the plant bears black and poisonous berries.

Baner, **Banner**, or **Banier**, **Johan** (1596-1641), Swedish general, b. Djursholm near Stockholm, and d. at Halberstadt in Germany. At the battle of Breitenfeld, 17 Sept 1631, he commanded the right wing of the army under Gustavus Adolphus, and on the death of Gustavus he was made field-marshal. His two most famous victories were those of Wittstock in 1636 and Chemnitz in 1639.

Banff: 1. Royal and parl. burgh, cap. of Banffshire, Scotland, at the mouth of the R. Deveron on the Moray Firth, 50 m. NW. of Aberdeen. B. is a tn of considerable antiquity, having received its first charter from Malcolm IV in 1163, and has many old buildings of architectural interest. In the grounds of the old castle, the bp. of Archbishop Sharp, is the comparatively modern castle (formerly the property of the Earl of Seafield, now belonging to the Community Association). Prin. modern buildings include the Sheriff Court House, Town House, Chalmers Hospital, B. Academy, the masonic hall, the museum, and Duff House, which was presented to the citizens of B. and of the adjoining tn of Macduff by the then Duke of Fife in 1906. B. is a holiday resort with sea and riv. fishing and a golf-course; iron founding and boat-building are carried on. Pop. 3500.

2. Post-tn, Alberta, Canada, on the

Canadian Pacific Railway, 922 m. W. of Winnipeg and 560 m. E. of Vancouver. Here is B. National Park, estab. in 1885, the oldest of Canada's national parks and the second largest in Canada (area 2584 sq. m.); it is a noted tourist resort. Pop. 2860.

Banffshire, maritime co. of NE. Scotland, bounded on the N. by Moray Firth, on the E. and S. by Aberdeenshire, and on the W. by the cos. of Inverness and Moray. Pictish remains are to be found at Rothiemay, Ballindalloch, Boharm, and elsewhere, and medieval remains at Balvenie, Auchindoun, Findlater, and Keith. The co. was the scene of many conflicts between the Scots and Norse invaders. B. is mountainous in the S., the surface being flatter and more fertile in the N. Partly in the co. are the Cairngorms (q.v.). The chief rivs. are the Spey, Avon, and Deveron, and the prin. lochs are Loch Avon and Loch Bulg. Cattle-breeding is the prin. rural industry, and other important occupations are fishing, whisky, and woollen manufs. The co. tn is Banff, and other tns include Buckie, Keith, and Macduff. The co. returns one member to Parliament. Area 630 sq. m.; pop. 50,000. See W. Barclay, *Banffshire*, 1922.

Bang, **Hermann Joachim** (1857-1912), Dan. author, b. in the is. of Seeland; educ. at the academy of Sorø and at Copenhagen. He is the chief exponent of Dan. impressionism, and his novels mostly deal with the lonely and miserable life of insignificant people. His works include *Haafløse Slægter*, 1880, *Fædra*, 1883, *Stille Eksistens*, 1886, *Liv og Død*, 1900, and *Mikaël*, 1903. He also wrote poetry and sev. critical works. See L. E. Grandjean, *H. Bang*, 1942.

Bang, **Nina Henriette Wendeline** (1866-1927), Dan. Social Democrat politician, b. Copenhagen. From 1913 to 1917 she was a city councillor of Copenhagen, and in 1918 was elected a member of the Upper House of the Dan. Parliament. In 1924 she became education minister, being the first woman to hold Cabinet rank in Denmark.

Bangalore, tn of Mysore state, India, 216 m. by rail W. of Madras, and 70 m. NE. of Seringapatam. It is situated over 3000 ft above sea level, and was a considerable European settlement. The fine botanical garden is worthy of note. The tn was a favourite residence of Hyder Ali. It was captured by Lord Cornwallis in 1791.

Bangar, tn in La Union prov., Luzon, Philippine Is., 20 m. from San Fernando. Rice is the chief product. Pop. 14,988.

Bangka, or **Banka**, is. of Indonesia, in the Java Sea off the SE. coast of Sumatra, from which it is separated by B. Strait. Area 4611 sq. m. Generally hilly, with swampy coastal areas, it is one of the world's largest sources of tin; it also has deposits of iron, manganese, gold, lead, copper, and wolfram. The miners are Chinese. Pop. (including the off-lying is. of Lepar and Liat) c. 205,500. Pangkalpinang is the cap. The Dutch gained control, 1688; B. was also occupied

temporarily by the British, 1812-14. Occupied by Japanese in Second World War. B. became part of Indonesia in 1950.

Bangkalan, tn on the coast of Madura Is., Indonesia, a trading centre. Pop. 12,000.

Bangkok, cap. of Thailand, on the Menam, 20 m. from its mouth. The area of the city is about 15 sq. m., and the pop., estimated in 1947, is 889,538, of which about one-third is Chinese. The older part of the city is built on rafts, but there are more streets than formerly and people move about in motors rather than in boats. Most heavy labour is done by Chinese, and trade conducted by Eurasians, Chinese, and Indians. Nearly every road has its trams and omnibuses, taxi-cabs, and jinrickshas. The city is the terminus of 4 railway lines. Huge structures of reinforced concrete are separated by wooden huts. The royal palace is in size a small city. The modern throne hall, about a mile away, is of white marble brought from Italy. There are many Buddhist monasteries and the Buddhist temple known as the Golden Mount (c. 400 ft high) is a notable landmark. The Chulalongkorn hospital is probably the finest in the Far E.; it has a snake park attached to it. Antidotes are made from their venom. Gambling in B. is prohibited by law. There are sev. hundred second-hand shops for the sale of curios. Fruit gardens supply the city with a bounteous supply of fresh food, including rice, the staff of life, while especially for the poorer classes fish takes the place of meat. The chief exports are rice and teak; the imports, textiles, bullion, and gold leaf. The number of its beautifully coloured temples make B. one of the most picturesque cities in the E. The city suffered severely during the Second World War. It surrendered to the Jap. forces on 13 Dec. 1941. After the war B. was the scene of a *coup d'état* by Marshal Pibul Songkram, whose party, the Tharmathipat, seized control of the gov. on 10 Nov. 1947.

Bangor: 1. Episcopal city, seaport, and municipal bor., Caernarvonshire, Wales, on the Menai Strait, 9 m. NE. of Caernarvon. The chief trade is the export of slate from the Penrhyn quarries. The cruciform cathedral was restored by Sir Gilbert Scott (1869-80). The Univ. College is situated here. Pop. 13,000.

2. Seaside resort and dormitory tn on Belfast Lough, co. Down, N. Ireland, 12 m. NNE. of Belfast. Its great monastic school was world famous. Pop. 25,000.

3. City and co. seat, Penobscot co., Maine, U.S.A., on the Penobscot R. at its junction with the Kenduskeag Stream. It is the third largest city in the state, and has extensive manufs. of boots, shoes, clothing, dental supplies, tools, machinery, and furniture; it is one of the chief lumber depots of the U.S.A. B. is a port of entry for ships, lumber, paper, and pulpwood. Pop. 31,558.

Bangorian Controversy, dispute which arose out of a sermon preached before George I in 1717 by Bishop Hoadly of

Bangor. In this sermon Hoadly (q.v.) denied the right of the Church to exercise authority over the conscience. The Lower House of Convocation was preparing to take steps against the author of these opinions, when it was prorogued by the Crown. Convocation met after this only rarely, and for purely formal business until 1847. The royal licence to transact business was granted again in 1852.

Bangs, John Kendrick (1862-1922), Amer. author, b. Yonkers, New York. Educ. at Columbia Univ., he ed. *Harper's Weekly*, 1898-1901, and *Puck*, 1904-5, and pub. many extravagantly farcical works, including *Tiddledywinks Tales*, 1890, *The Tiddledywink Poetry Book*, 1890, *Mr Bonaparte of Corsica*, 1895, *A Houseboat on the Styx*, 1895, *The Idiot at Home*, 1909, *Autobiography of Methuselah*, 1909, and *Echoes of Cheer*, 1912.

Bangweulu, lake, N. Rhodesia, 3700 ft above sea level. Area of open water, about 1670 sq. m. in dry season. It is said to be nowhere deeper than 15 ft. It was first discovered by Livingstone in 1868.

Banian Days, originally a sailor's name for the days when meat was not served to the crew. The phrase has now come to be applied to any period of indifferent feeding. The expression owes its origin to the abstention from meat practised by the Banians, a class of Hindu merchants who were a caste of the Vaisya, who, on religious principles, abstain from meat. It is estimated that there are over 3,000,000 of them scattered over various parts of Asia.

Banias: 1. Vil. formerly in Palestine, now in SW. Syria, 40 m. SW. of Damascus, on the site of the ruins of Paneas, afterwards Caesarea Philippi. It is situated near the sources of the Jordan, at the foot of the Anti-Libanus (Jebel Heish), the Mt Hermon of Scripture. B. came into prominence during the time of the crusades, about the 13th cent., when the castle of B. was built, the ruins of which may still be seen.

2. Tn of W. Syria, on the Mediterranean, 25 m. S. of Latakia, terminus of the Iraq Petroleum Co.'s 30-in. pipeline from Kirkuk in Iraq (completed 1952).

Banim, John (1798-1842), novelist, poet, and dramatist, b. Kilkenny, where his father was farmer and trader. He was educ. at Kilkenny College, and studied at the academy of the Royal Dublin Society. In 1820, after sev. years of ill health and disappointment, he removed to Dublin, ultimately abandoning art for literature. In 1821 the production of his tragedy, *Damon and Pythias*, at Covent Garden, brought B. fame and money, and in 1822 he and his brother Michael, having settled in London, set about the writing of a series of Irish tales on the lines of Scott's Waverley novels. Their *Tales of the O'Hara Family* (1st series, 1825; 2nd series, 1826) won popularity. He was granted a civil list pension in 1836. Amongst his other works is the novel *The Boyne Water*, 1826, also a book of essays entitled *Revelations of the Dead Alive*, 1824, the tragedies of *Turgesius* and

Sylla, and the poem *The Cell's Paradise*, 1821. See life by P. J. Murray, 1857.

Banim, Michael (1796-1874), novelist, b. Kilkenny, elder brother of John B. He was originally intended for the law, but was compelled to renounce his studies owing to his father getting into financial difficulties. Like his brother, he was the victim of ill health, and in his latter years lived in reduced circumstances. He was joint author of the *Tales of the O'Hara Family* and probably wrote the greater part of the delightful *Father Connell*, 1842, while he was sole author of the following tales among others: *The Croppy*, 1828; *The Ghost Hunter and his Family*, 1833; *The Town of the Cascades*, 1864.

Banishment, term derived from the old word *ban* (see **BAN**). In primitive society B. meant the exclusion of an individual from the protection of the law and the benefits of society, a sentence of outlawry which also involved the confiscation of his property. In more recent times the word has come to mean expulsion from a country or place in punishment for crime. In England B. was introduced as a punishment in judicial procedure in a statute of Elizabeth's reign, and in the form of transportation the practice received the sanction of Eng. law until far on in the 19th cent.

Banister, see **BALUSTER**.

Banja Luka ('Baths of St Luke'), tn in Bosnia-Hercegovina, Yugoslavia, on the Vrbas. It dates from Rom. times, and has many interesting, oriental streets and sev. mosques. It is the seat of Rom. Catholic and Orthodox bishoprics, has a spa, and is a commercial centre. Pop. 37,800.

Banjermasin, or **Bandjermasin**: 1. Dist., Indonesian Borneo, intersected from N. to S. by mts, and watered by the Banjar and other rvs. Rubber is the main export; the region also produces gold, diamonds, gum, wax, spices, etc. The pop. is composed mostly of Dyaks.

2. Tn, cap. of Indonesian Borneo, on the Martapura R. B. is largely built on ples. There is an extensive trade in local products, and an oil refinery. Pop. 68,000.

3. Riv. in SE. Borneo. It is navigable for about 50 m. from the sea.

Banjo (Negro corruption of the word *bandore*, derived from Gk *pandora*, a musical instrument with 3 strings), stringed musical instrument, played with the fingers, often without frets to guide the stopping. It consists of a long neck, on

which are the tuning-pegs, and a drum-like vellum body, and had from 5 to 9 strings, the 5-stringed B. being now the standard pattern. It was introduced into America by the Negroes. The pitch is one octave lower than the written notes.

Banjoemas, see **BANYUMAS**.

Banjoewangi, see **BANYUWANGI**.

Bank Holidays, first estab. by Sir John Lubbock's (Lord Avebury) Act of 1871. B. H. in England and Ireland are Easter Monday, Whit Monday, the first Monday of Aug., Christmas Day, 26 Dec. (Boxing Day, q.v.), or if that day falls on a Sunday, the 27th, and Good Friday. In Ireland 17 Mar. (St. Patrick's Day) is also a Bank Holiday. In Scotland B. H. are Christmas Day, New Year's Day, and the first Mondays of May and Aug. On these days banks are closed, bills and notes due on such days becoming payable on the next day, except in the case of Christmas Day and Good Friday. Bills, etc., due on these two days are payable on the preceding day.

Bank Note, promissory note issued (usually) by a bank and payable to the bearer on demand. It originated in the receipts given by 17th-cent. goldsmiths for the precious metals deposited with them for safe keeping during the troublesome times of the Civil war. In England the Bank of England has a monopoly of note issue; other banks issue notes in Scotland, N. Ireland, and the Isle of Man. The machinery and processes for printing B. N.s and other forms of securities employed in London were for a long time more developed there than elsewhere in the world. Orders for this kind of work still come to London from most of the important countries of the world except the U.S.A. The engraving and printing of B. N.s is a peculiarly Brit. industry; Waterlow's have carried on the business from 1811 to the present day, De La Rue's from 1815, and Bradbury, Wilkinson from 1855; and in all of these firms the staffs include men who have inherited their skill from their grandfathers and fathers before them. The business requires organisation of safeguards against forgery and other forms of fraud. Every attempt of the forger adds something to the knowledge of the B. N. printer. In these days it is the camera and photo-mechanical processes to which the forger usually resorts, and the B. N. printer has to thwart these efforts with finer and more intricate designs and engraving, with complicated colour combinations. The actual machinery and methods of engraving and printing are in themselves strong safeguards, for the machines are altogether different from those used in ordinary printing. A geometric lathe of extremely intricate mechanism is used for engraving interlacing patterns on B. N.s. The designs are obtained by combinations of gearing and pattern wheels, and without having possession of the key figures to the combination, no one could make a repeat. This is a Brit. invention, but these machines are now also made in the U.S.A. and Germany, as are the transfer presses for impressing



BANJO

the engraved designs into the steel printing plates. The lathe was originally invented by Jacob Perkins, who came over to this country to exploit it and founded a firm which to-day is still printing securities. Any person outside the recognised B. N. printers who should attempt to buy such machines would not only at once be under suspicion, but would have to give proof of his bona fides. The machines for printing from steel plates have been gradually evolved from the first crude handpress, which was practically a mangle, for printing from flat plates, the inking, wiping, and application of pressure being done by hand. A Frenchman named Guy first constructed a machine for automatic, or semi-automatic, inking and wiping, originally for flat plates and afterwards for rotary printing for curved plates. Guy's machines were shown at the Paris Exhibition of 1874, and one was purchased by Bradbury, Wilkinson, who later installed a more elaborate machine made by Voirin of Paris. Some machines used at the present day are designed and manu. by the firms using them, and the features of the design are jealously guarded. Other fully automatic machines for single and multi-colour printing are now available on the market. See BANKS and FIDUCIARY ISSUE.

Bank of England, The. owes its origin to the scheme of Wm Paterson (q.v.) for meeting the expenses of the Fr. war which followed the revolution of 1688. Other schemes were proposed, but Paterson's was eventually accepted by Montagu, Chancellor of the Exchequer, and it was agreed that in consideration of the sum of £1,200,000 subscribed and lent to the gov., the subscribers were to be incorporated under the title of the Governor and Company of the B. of E. The B. of E. remains the most famous and at the same time 'the most original' bank in the world. Its importance to the gov. and to the Eng. nation is shown by the loans made to William III and Queen Anne which enabled England to regain the position among European nations she had then to all appearance lost. The gov. of the day sought the B. of E.'s assistance on the eve of all the 18th-cent. wars, and on the day of reckoning which followed the futile transactions of the Land Bank and of the S. Sea Bubble. Further, not only the estab. of public credit by the formation of the permanent debt, but the organisation of the floating debt and even the conversion of the national debt, are, in the main, the work of the B. of E.; and in return for these services the gov. has always defended the interests of the B. of E. in times of stress.

A comprehensive hist. of the B. of E. necessitates a study of the business methods of the goldsmiths as exchangers and as discounters of bills and loans at high rates of interest. So successful had they become that large sums were deposited, and receipts for these savings circulated better than the coins. Thus goldsmiths' notes are to be regarded as the earliest form of bank notes in Eng-

land. It is therefore not surprising that the goldsmiths offered some opposition to Paterson's proposal. There was also opposition from the Tories, who declared that a State bank would be one step towards a republic; while certain Whigs opposed it on the ground that it would lead to an absolute monarchy, inasmuch as the king could then escape the financial control of Parliament; while yet others feared that the B. would absorb all the money in the kingdom and subject commerce to usurious exactions. But political necessity decided the matter. Sir John Houblon was the first governor, with Michael Godfrey deputy-governor, and a court of 24 directors. The subscription list was opened at the Mercers' Chapel, June 1694, and proved a great success. The corporation was to lend the whole of its capital to the gov. and to be paid interest at 8 per cent, and to be paid £100,000 per annum for expenses. The corporation was also to have the privileges of a bank for 12 years, the gov. reserving the right of annulling the charter after giving 1 year's notice. The corporation was not authorised to borrow or owe more than its capital, and if it did the members became personally liable in proportion to the amount of their stock. The corporation was not to trade in merchandise, but could deal in bills of exchange, gold or silver bullion, and sell any wares on which it had lent money. The B. was started on condition that a certain sum should be lent to the gov., but the increase in the following years was due to further loans to the gov. of the day, and in return the B. obtained renewals of its charter and also other advantages. The influence of the B. during the 18th cent. was almost as great as in the present day, for at that time the large issues of notes made it a very formidable opponent of London bankers. It became the chief factor in the money market, and therefore fixed the price of the loan capital. This was so because it was then the only joint-stock bank in existence, and as such held large deposits in comparison with the private banks. The rate of interest fixed by it became the key to market rates, and it still remains so. The rate charged by the joint-stock banks for advances is, by convention, 1 per cent above bank rate (with a minimum of 5 per cent for personal borrowers).

The business of the B. of E. consists of 3 divs.: (1) the management of the national debt; (2) issue of bank notes (the Bank Act of 1844 divided the issue from the banking dept and from that date the 2 offices were kept distinct); (3) gov. and central banking. The B. of E. carried on its business in Grocers' Hall until 1732. Its present building in Threadneedle Street, London, was erected to the design of Sir Herbert Baker and incorporated features of earlier buildings on the site by Sampson (1732-4), Sir Robert Taylor (1765-88), and Sir John Soane (1788-1833). There are country branches at Birmingham, Bristol, Leeds, Liverpool, Manchester, Newcastle, and Southampton.

Bank of England (Nationalisation) Act, 1946. Passed by the third Labour Gov. with the aim of bringing the capital of the B. of E. into public ownership and the B. under further control, and to make provision respecting relations between the Treasury, the B. of E., and other banks. Under the Act the whole of the B. stock was transferred to Treasury nominees 3 months after the passing of the Act. The new court of directors consists of a governor, deputy-governor, and 16 directors (8 fewer than previously)

given to any such request or recommendation.

Nationalisation did not much change the B. of E.'s status and functions. The governor still works hand-in-hand with the Treasury, and the volume of purchasing power is controlled in much the same way as before, namely, in accordance with gov. policy modified by the B. of E.'s advice. The control is exercised in 3 ways: first, directly on the volume of currency; second, on the volume of 'near-money' (short-term



Hulton Picture Library

THE BANK OF ENGLAND

appointed by the Crown. The governor and deputy-governor hold office for 5 years, the directors for 4, and all are eligible for reappointment. Members of Parliament, persons holding offices of profit under the Crown, aliens, and persons disqualified under the B.'s charter are excluded from appointment. Only 4 of the directors may be employed whole time by the B. The Act also provided for the drawing up of a new charter. The Treasury may give directions to the B. from time to time, but subject to such directions the affairs of the B. are managed by the court of directors in accordance with the charter. The B. may, if they deem it necessary in the public interest, request information from, and make recommendations to, bankers, and may, if so authorised by the Treasury, issue directions to any banker for the purpose of securing that effect is

credit nearly as liquid as cash), both directly by deciding with the Treasury the issues of Treasury bills and indirectly by bank rate; thirdly, by the ability to influence financial institutions.

Whatever the pros and cons of nationalisation, the B. of E. has undergone much the same kind of change as the central banks of other major countries: the Federal Reserve Bank of the U.S.A., the Banque de France, the Reichsbank, and others. In the last 40 years the B. of E. has taken on extended functions because of the greater volume of governmental financial activities (corresponding to the greater economic role of government). It has also passed from managing a credit policy based on international movements of gold to one based on general national political considerations. The B. of E. has become an instrument of gov. in its attempt to control the general

economic life of the nation. How far it is possible to achieve national economic objectives while at the same time belonging to a world economy is one of the great problems facing statesmanship. It may be that being part of a system of free international exchange is incompatible with the maintenance of permanent full employment in any one country, just as it is impossible to maintain full employment in Warwickshire when there is a free exchange between it and other counties of Britain.

The changes in the role of the B. of E. are illustrated by a comparison of its weekly returns in 1914 and 1954:

ISSUE DEPARTMENT

	1914	1957
	£m	
Notes issued:		
In circulation	29.7	1,987.1
In Banking Dept	25.4	13.3
	55.1	2,000.4
	1914	1957
	£m	
Government debt	11.0	1,996.3
Other securities	7.4	0.7
Gold and coin	36.7	3.4
	55.1	2,000.4

BANKING DEPARTMENT

	1914	1957
	£m	
Capital	14.6	14.6
Res *	3.5	3.4
Public deposits:	12.7	10.5
Bankers' deposits	54.4	228.2
Other deposits		75.6
	85.2	332.3
	1914	1957
	£m	
Government securities	11.0	269.1
Other securities		
Discounts and advances	47.3	23.4
Securities		24.1
Notes	25.4	13.3
Coin	1.5	2.4
	85.2	332.3

* Undistributed profits

See also BANKS and BANKING; CURRENCY; DEBT CONVERSION; MONEY; PUBLIC DEBT.

Consult John Francis, *The History of the Bank of England* (3rd ed.), 1848; W. J. Lawson, *History of Banking* (2nd ed.), 1855; J. E. Thorold Rogers, *The First Nine Years of the Bank of England*,

1887; Sir J. H. Clapham, *The Bank of England* (2 vols.), 1938; R. S. Sayers, *Financial Policy*, 1939-45, 1956; Sir Henry Clay, *Lord Norman*, 1957.

Bank Rate, minimum official rate at which the Bank of England will rediscount treasury bills and other first-class bills of exchange, i.e. lend money on short term. When the B. R. is effective, all other short-term rates in the London money market fluctuate with it. Thus in recent years the rate of discount on three-month treasury bills, the rates applied by the commercial banks to loans at call and short notice, to deposits, and to advances to customers, and the rates paid by discount houses and other financial institutions which accept deposits, have varied with B. R. B. R. thus governs the price of credit. For long periods before the war it exerted a powerful influence on the tempo of the economy. When it was raised it dampened inflationary tendencies by making credit dearer; it could also encourage expansion in economic activity generally by making credit cheaper and thus stimulating business, although it was less successful in this task than in that of discouraging over-expansion.

When Britain was on the gold standard, B. R. was used to maintain the exchange value of sterling. It was raised if gold was tending to flow out of the country; higher short-term rates in London then attracted short-term capital from overseas, and gold was sent to London and thus helped to maintain the gold reserve necessary for the gold standard.

Now that Britain is not on the gold standard, this function of B. R. no longer applies; but B. R. could still help to maintain a balance between payments to other countries for imports, etc., and payments from other countries for exports, etc. An adverse balance of payments must still be avoided in order to protect the gold and dollar reserves (q.v.) necessary to meet unforeseen emergencies in international trade and transactions.

It was for this reason that the B. R. was raised in 1951 for the first time in nearly 20 years. Except for a few weeks on the outbreak of war in 1939, B. R. was 2 per cent throughout this period. It was raised in 1951 because the balance of payments had become adverse and a serious drain on the gold and dollar reserves followed. B. R. was raised to 2½ per cent; and again to 4 per cent in 1952. It was reduced during 1953 and 1954 when economic recovery had restored the reserves, but was raised again in 1955 to 4½ per cent, in 1956 to 5½ per cent, and in 1957 to 7 per cent when there was more economic trouble.

The effectiveness of B. R. and the desirability of using it were questioned by some economists in the 1930's, and the doubts have been renewed since the end of the Second World War. They relate to the difficulties of changing costs and prices upwards and downwards without friction by altering the supply of money.

This affects the volume of spending and therefore of employment. In particular, a rise in B. R. reduces spending and may cause unemployment. Undoubtedly, and particularly in the post-war world when full employment and the increase in political power of the organised trade unions have increased resistance to wage reductions, it is not easy to work a monetary system which requires general upward and downward movements in prices and costs. But this difficulty applies not only to B. R. but to any method of obtaining these movements. At bottom, the objection is really to making domestic monetary arrangements part of a wider world economic system. The question is whether Britain can isolate herself from relations with the rest of the world. In view of her dependence on imported food and raw materials, such isolation does not appear to be practicable. At least, it might be practicable provided her people were prepared to accept a much lower standard of living. The difficult choice is between continued over-full employment and high living standards.

In any event, B. R. has been used since 1931 with the intention not of *deflating* the economy from a situation of full employment, but of *disinflation* it from one of over-full employment to one of full (or almost full) employment.

B. R. is fixed by the directors of the Bank of England at their weekly meeting and is announced on Thursday mornings. Changes in the B. R. since before the First World War have been as follows:

Year	No. of Changes	Highest	Lowest
1914	8	10	3
1915	None	5	5
1916	1	6	5
1917	2	6	5
1918	None	5	5
1919	1	6	5
1920	1	7	6
1921	4	7	5
1922	4	5	3
1923	1	4	3
1924	None	4	4
1925	4	5	4
1926	None	5	5
1927	1	5	4.5
1928	None	4.5	4.5
1929	5	6.5	4.5
1930	4	5	3
1931	6	6	2.5
1932	7	6	2
1933-8	None	2	2
1939	3	3.88	2
1940-50	None	2	2
1951	1	2.5	2
1952	1	4	2.5
1953	1	4	3.5
1954	1	3.5	3
1955	2	4.5	3
1956	1	5.5	4.5
1957	2	7	5

From 1932 to 1952, when B. R. was so low as to be virtually ineffective in the money markets, the Bank of England

used Open Market Operations to control the volume of credit and the gov. used physical controls (rationing, licensing, allocations, and price controls) to regulate the volume and direction of investment.

There are differences of opinion about how far B. R. has been effective since 1951 in checking inflationary tendencies. It has been argued that action by the gov. in increasing the supply of money or near-money, by expanding the volume of treasury bills and other means, has nullified the effect of raising the price of credit. Furthermore, as public bodies have, since the end of the Second World War, disposed of 35 to 40 per cent of the national expenditure, B. R. is effective only in the remainder, since the gov. can make credit available to its own organisations or local authorities at rates lower than those in the money markets.

See BANK OF ENGLAND and MONEY.

Banka, see BANGKA.

Banka, or Mengka, tn on the is. of Formosa. It is in a tea-growing dist., and its port is Tamsui. Pop. 45,000.

Banker and Customer (Law). The Eng. law rules that the relation between B. and C. is that of debtor and creditor, as was laid down in the House of Lords in *Foley v. Hill*, 1848, 2 H. of L. 28. The banker is not a trustee, responsible to the depositor for the way in which he uses his money, and the banker keeps what profit he may make with the money deposited. If the bank stops payment, the depositor ranks with the other creditors. If he has not used his account for 6 years and there has been no payment of interest or repayment by the bank of any part of the deposit or no acknowledgment in the meantime, the debt is statute-barred. A banker is obliged to honour a customer's cheques provided only that there are sufficient funds to his credit, and is liable for damages without proof of actual injury or loss if he dishonours cheques. This liability holds good only between the banker and the drawee of the cheque, and the person in whose favour the dishonoured cheque has been drawn has no right against the banker. The banker's authority to pay money on cheques is ended by the customer's death, insanity, or bankruptcy, or by notice of an act of bankruptcy. A customer may by order revoke the authority to pay cheques or a particular cheque, but such order must be in explicit terms. A garnishee order against the funds of a customer at a bank attaches to all the funds, and a banker may not pay on any cheques drawn by the customer, even if the amount of the judgment is exceeded by the funds. Valuables, such as plate, etc., deposited by a customer for safe custody with a banker, are not in the same position as funds deposited. The banker acts as a bailee, and they cannot be taken by the banker as set-off against a debt due from the customer, nor, in the case of the failure of the bank, do they rank with the bank's assets; the banker is liable for loss through negligence on his part, and they can be recovered from the banker after any lapse of time. The deposit of

valuables for safe custody differs from the deposit of securities, for on these last the banker has a lien, which covers also all cheques and bills paid in for collection by the customer. The banker can retain all such against his customer's debt, and may realise the securities. This banker's lien can, of course, only be exercised where there is no agreement between him and the customer to the contrary, or where goods are deposited only for safe custody or money is paid in to meet particular bills. Further, a banker may not alter any system of dealing which has been recognised as holding good between him and the customer without due notice. If securities have been deposited as cover for a specific loan, the banker's lien terminates when the loan has been repaid. An overdraft or advance is arranged by agreement, and interest may be charged; a customer, drawing a cheque when there are not sufficient funds to meet it, makes an implied request for an overdraft, which the banker may refuse by dishonouring it. Much of the law affecting B. and C. is that which relates to cheques, bills of exchange, and other negotiable instruments. Finally, a banker is bound to keep secret all matters relating to his customer's account, unless authorised to reveal them or compelled to do so by law. See H. Hart, *Law of Banking* (4th ed.), 1931; J. Paget, *Law of Banking* (5th ed.), 1947; E. Sykes, *Banking and Currency* (9th ed.), 1947.

Bankers, Institute of, founded 1879, association of men and women connected with various branches of banking. Its objects are to facilitate the consideration and discussion of matters of interest to B.; to afford opportunities to its members for the acquisition of knowledge; and to take measures which may be desirable to further the interests of banking. This it does in part by the arrangement of lectures on banking, mercantile law, political economy, and other subjects, and partly by the issue of certificates to those who pass the examinations approved by its council. The ordinary meetings of the institute are held in London from Nov. to May, and the papers read and discussed are pub. in the institute's *Journal*. There are local centres of the institute in the chief prov. tns of England and Wales. Its fellows, associates, and ordinary members number over 40,000. London address, Lombard Street, E.C.3.

Bankers' Association of America, see AMERICAN BANKERS' ASSOCIATION.

Bankhead, Tallulah (1903-), Amer. actress, b. Huntsville, Alabama, U.S.A., daughter of Wm Brockman Bankhead and his wife, Adeline Eugenia (Sledge). She married John Emery (marriage dissolved). Her first appearance on the stage was at the Bijou Theatre, New York, 1918, as Gladys Sinclair in *Squab Farm*. She had a successful career in America up to 1922, then came to England and appeared as Maxine in *The Dancers* at Wyndham's Theatre, 1923, with Sir Gerald Du Maurier. Her strong personality and beauty and her characteristic

husky voice caught the public fancy, and she became a star and one of the most talked-of people in the country. *Conchita* at the Queens in 1924 was a complete failure and was booed from the stage, but T. B. had many successes between 1924 and 1930, when she returned to America. Later successes included *The Little Foxes* and *The Skin of Our Teeth*. She is extremely popular, and although a good actress is more famous for her beauty and her most arresting and controversial personality than for her success on the stage.

Banking, see BANKS.

Banking in Australia and New Zealand.

Under an act passed in 1939 the Gov. of New Zealand has complete control of the Reserve Bank of New Zealand. The minister of finance is empowered to vary or suspend the minimum reserve of 25 per cent; and power is given to revalue the gold coin and bullion held by the bank on the basis of the market value of fine gold and to transfer any profit so obtained to a special reserve account. In Australia the governor in 1942 announced far-reaching measures to control the operation of trading banks and to prevent expansion of credit by the banks, in accordance with recommendations of the Royal Commission on the Monetary and Banking System.

Banking in England. The rise of B. in E. has often been dated from the seizure by Charles I in 1640 of the bullion deposited in the Tower of London by the city merchants. Though it was returned to them, for the future they deposited it for safety with the goldsmiths, who not only did business in money-changing, but were also employed in taking charge of rents and money on deposit from the country gentlemen, granting interest thereon. The goldsmiths had begun taking deposits in James I's reign, but the development of their business dates from the Civil war. They gave receipts for the money deposited, and these receipts, known as goldsmiths' notes, the earliest form of bank-note in England, circulated even more freely than coin, and large transactions were carried out by their means as late as 1696. During the Protectorate the goldsmiths were of assistance in financing the gov., and after the Restoration they became lenders to Charles II, receiving as much as 12 per cent or over, and paying less than half that rate to their creditors whose deposits they used. In 1672 came the suspension of exchequer payments, a declaration of national bankruptcy which brought ruin not only to the goldsmiths, to whom the gov. owed £1,300,000, but also to their depositors.

The successful example of the Dutch banks, the demand for better security for deposits, a correspondingly safer form of paper currency than the goldsmiths' notes, together with a lowering of the rates of interest (charged in spite of the still existing laws against usury), still further the political necessities of the gov. in the matter of loans: all these contributed to the demand for the estab. of a properly regulated bank, a banking system, and the

end of the goldsmiths. Three private banks, Child's, Martin's, and Hoare's, which later carried on business in London were descended from firms of goldsmiths mentioned in the *London Directory* of 1677. Smith's Bank at Nottingham claims to have been founded in 1688; it was later amalgamated with the Union of London Bank, under the style of the Union of London & Smith's Bank. Other early banks, now amalgamated with other firms, were the Bristol Old Bank, 1750, and the Hull Old Bank, 1754. The proposal for the foundation of the Bank of England (q.v.) came from Wm Paterson (q.v.), Michael Godfrey, and other London merchants in 1691. The foundation took place in 1694, by Act of Parliament, the charter being granted on 27 July for 12 years, to 'the Governor and Company of the Bank of England.' The restoration of the coinage, the attempt to found a rival land bank, and the gov.'s pressing need for money led to the extension of the Bank's privileges and capital by the Acts of 1697 and 1709, especially in the strengthening of its monopoly, and interest was reduced to 6 per cent. No bank whose members consisted of more than 6 was allowed in England to borrow or take up money on its bills or notes payable on demand. This was thought to be sufficient protection against competition, as at that time no bank could, it was supposed, do business without the power of issuing notes. No joint-stock banks were, in fact, founded. In 1722 the Bank's reserve, called the 'rest,' was estab. In 1750 the rate of interest on the debt was converted to 3 per cent, the debt to the Bank amounting then to over £11,000,000, and in 1751 the Bank was given the administration and management of the national debt, which it holds to the present day. Further renewals of the charter were made in 1764 and 1781. In 1795 the first issue of £5 notes was made, and later, for a short period, £1 notes. In 1797 cash payments were suspended by the Bank Restriction Act, owing to the general drain of gold and financial strain of the war; the Bank's notes were thus made practically legal tender. The Bullion Committee Report was issued in 1810 and rejected by Parliament, and cash payments were not resumed till 1821. The over-issue of notes by the small country private banks and the constant failures led to the Act of 1826, which allowed joint-stock banks, i.e. of any number of partners, and with the power of issuing notes; but they were not allowed in London or within a 65-m. radius. No notes were henceforth, until the First World War, allowed in England below £5. In 1833 joint-stock banks without note issue were allowed within the 65-m. radius; it may be noticed that the use of cheques had by this time begun to replace the use of notes. Finally, the Bank of England notes were made legal tender. In 1844 came Peel's great Bank Charter Act. The main features of this Act, as regulating the bank's position at the present day, are outlined in BANKS and BANKING. The Act also confined the

right of note issue to those banks which possessed the right before 1844; as each lapsed or became absorbed, the limit to the Bank of England was expanded to the extent of two-thirds of the lapsed issue. The note-issuing powers of Eng. banks is of little importance at the present day, and the Bank of England note is the only circulating note in England. In 1862 companies with liability limited to the amount of their shares were allowed, and in 1879 unlimited companies formed before the Act of 1862 were allowed to adopt limited liability. Practically all the joint-stock banks availed themselves of this Act.

The 19th cent. saw sev. crises in banking. The first, that of 1847, was the result of the speculation in railways and a hazardous extension of credit. On 1 Oct. all advances on public securities were stopped, and the bank rate was 8 per cent at the end of the month, when the coin and bullion reserve at the Bank of England fell to a little over £1,500,000. The Bank Act was suspended on the 25th, and though no notes above the limit were issued the panic ceased, but there had been serious failures of banks in Liverpool, Manchester, Nottingham, and the W. of England. Over-expansion of credit and a great depletion of banking reserves led to the panic of 1857, which continued even after the Bank Act was suspended on 12 Nov. On this occasion notes in excess of the limit were issued amounting to nearly £1,000,000, and the panic did not cease till the beginning of 1858. In 1866 the panic was marked by the historic failure of Overend, Gurney & Co.; it is stated that £4,000,000 in gold and notes was withdrawn from the Bank of England in one day; the rate was raised to 10 per cent and the reserve fell to less than \$500,000. The Bank Act was suspended, but no excess issue actually took place. The failure of the W. of England Bank in 1878 caused great distress, but there was no general panic. In 1890 the failure of the great financial house of Baring (*see* BARING, family) resulted in a serious crisis. London had become the centre of the money markets of the world, and consequently had to bear an international as well as a national strain. This fact was marked in the New York and Amer. panic of 1907 and 1908, when gold importation to the U.S.A. was conducted through London.

Banking during the First World War. At the outbreak of the First World War England was still the great creditor nation, most of the world's bill transactions being liquidated in London. The estimate of Great Britain's trade with the belligerent nations in Europe could be put at over £2,000 millions. An indication of the trend of events was given towards the end of July 1914, when the Ger. banks, in order to increase their cash reserves, began selling their securities in London. This caused some alarm and the London Stock Exchange was closed on 29 July. Germany's selling activities were transferred to the U.S.A., and the New York Stock Exchange was closed on 31 July.

When the war began there was a run on the banks, the reserve at the Bank of England falling to £10 millions. The bank rate rose to 10 per cent. The gov. took immediate action. The banks were closed from 1 to 4 Aug., and it was decreed that there should be a moratorium for bills falling due. This was a beneficial measure. To husband the nation's gold and to keep it concentrated at the Bank of England, arrangements were made to issue £1 and 10s. currency notes. These were made legal tender for any amount and were issued on a fiduciary basis. The issue of these notes was tantamount to the suspension of the Bank Act. The Bank of England decided to lend money to the banks to enable them to meet calls which might be made upon them while the excitement lasted. By this timely decision confidence was restored. Bank deposits rose immediately by £100,000,000 and the Bank of England deposits rose from £46,000,000 to £219,000,000. A Foreign Debt Committee was appointed to make advances to Brit. export traders against debts due to them from abroad. Advances of 50 per cent of the amount outstanding were made. A 6 months' bill was drawn by the trader upon his banker and accepted by him. The bill was left with the banker as cover for a loan of the amount required. The bill was renewable from time to time until 12 months after the close of the war. Any loss that might occur was distributed in the proportion of 75 per cent as to the exchequer and 25 per cent as to the accepting bank. As the bulk of foreign trade finance was carried on by means of bills of exchange, the gov. decided that it would be as well to let these instruments function as freely as possible. A scheme was therefore drawn up which set forth that: (1) the Bank of England would provide, when required by acceptors, the funds necessary to pay all approved promissory bills at maturity; (2) acceptors would be under obligation to collect from clients all funds due to them, such funds to go towards repayment of advances; (3) the Bank of England would not claim repayment of any amounts not recovered by acceptors for a period of 1 year after the close of the war; (4) the joint-stock banks, in order to induce new business, would arrange with the co-operation, if necessary, of the Bank of England and the gov. to advance the amounts required by clients to pay their acceptances at maturity. It is a creditable reflection on the quality of the business done by Brit. finance houses to note that the advances made by the Bank of England against bills of exchange were duly paid off. The foregoing were the chief measures adopted to meet the financial exigencies created at home by the war. Gold disappeared from circulation, its place being taken by treasury notes. These were partly covered by gold and partly by Bank of England notes and securities. Small notes had been issued by the Irish and Scottish banks for many years, and these banks were allowed to exceed their fixed issue limits of pre-war time. It is interesting to note that the

paper currency issued during the war was greater in face value than all the gold and silver produced since the discovery of America (1492).

The foreign exchanges were greatly disturbed during this period. This will be at once apparent when it is remembered that the usual method of paying for imports by exports had been so deranged. The excess of imports over exports for 1914 was approximately £450 millions, and this had to be liquidated. Matters were eased by loans raised in New York and credits arranged by the banks. As was natural, where the shipment of gold was restricted the old pairs of exchange disappeared, and the par between London and New York fell from 4·85 to 3·74.

Post-1918 problems. From the closing years of the First World War the history of banking must not be treated as abnormal, but as the evolving of new methods and means by bankers to meet conditions which had changed and were rapidly changing. The gold standard was restored in 1925, in accordance with a recommendation of the Cunliffe Commission of 1918. A treasury minute of 15 Dec. 1919 imposed a limit known as the Cunliffe limit on the issue of treasury notes and laid down that the uncovered note circulation in any year must not exceed the maximum uncovered circulation of the previous year. The policy of deflation carried out by the gov. in the following year checked the depreciation of sterling in relation to the dollar which had taken place as soon as the wartime control of the exchange rate was removed in 1919. When the pound and the dollar were near their former parity the Gold Standard Act of 1925 was passed whereby the Bank of England was again under an obligation to sell gold at the former price. The Bank was not, however, obliged to redeem bank notes and treasury notes in gold coin. In 1923 the Bank assumed control of the treasury note issue under the Currency and Bank Notes Act of the year. Bank notes of a pound and ten shillings were issued gradually to replace treasury notes. The amount of permissible fiduciary issue was accordingly raised to £260,000,000 and by the Currency and Bank Notes Act of 1939 it was raised again to £300,000,000. The fiduciary issue continues to be governed by these two Acts. The Treasury may, however, authorise a temporary increase by means of a minute laid before Parliament if requested by the Bank of England to do so. This occurred during the years which followed; by the end of the Second World War the fiduciary note issue stood at £1,350,000,000; in 1956 it had risen to £1900 millions, almost the whole of the note issue (only £500,000 of notes were backed by gold).

In 1931 it became clear that Britain could not maintain the gold standard. A financial crisis of the first magnitude had been precipitated (following a world depression), largely through the mismanagement of gold by the U.S.A. and France. That was not the sole cause of the crisis, for Brit. policy in 1925 was misconceived,

though none could have foreseen the subsequent developments. That policy implied, besides co-operative policies in other countries, adjustments in prices and therefore costs, including wages, which could not be made because of the opposition of the trade unions, who resisted wage reductions. Eventually, in 1931, in order to support the exchange, Britain was reduced to borrowing £130,000,000 in dollars and francs. But though the budget was balanced and the foreign drain on funds ceased for a time, there was another sudden drain of foreign funds. Faced with the prospect of parting with the rest of its gold reserves, the Bank of England gave up the struggle, and, for the second time since the war, Great Britain was forced off the gold standard. The Gold Standard (Amendment) Act was passed on 21 Sept. 1931, and the Bank's obligation to sell gold was suspended.

For some years before the First World War the amalgamation of banks had been going steadily on. The advent of the war hastened it considerably, and in 1918 there emerged the joint-stock banks known as the Big Five (Barclay's Bank, Lloyd's Bank, Midland Bank, National Provincial Bank, and Westminster Bank). A treasury committee appointed in 1918 decided that no further amalgamations without the approval of the gov. would be allowed, and that the Treasury and Board of Trade must give their consent before more absorptions could take place.

Financial and monetary policy in Second World War. There was no crisis on the outbreak of the Second World War, for experience in the First World War had taught what emergency measures were desirable in the way of financial and monetary policy. Yet there was nothing in the powers of the gov. taken under the Finance Bill of 1940 over persons and property which endangered money in any bank. Equally there was nothing to endanger savings in any way. Indeed the figure of small savings in savings certificates, defence bonds, and in the increase in balances in the savings banks since the beginning of the war amounted to more than £180,000,000 and the weekly figure for these savings averaged over £5,000,000. Immediately on the outbreak of war the Currency (Defence) Act was passed to amend the law with respect to the application and financing of the exchange equalisation account. The gov. announced on 6 Sept. 1939 that the gold reserve in the issue dept of the Bank of England had been transferred to the exchange equalisation account as part of the general plan put into operation for the strengthening of the nation's financial resources abroad. The value of the gold transferred (at 168s. per oz.) was about £279,000,000, and this entailed a corresponding increase in the fiduciary note issue of the Bank of England from £300,000,000 to £580,000,000. On 5 Sept. the price of gold had been fixed at 168s. per oz. by the Bank of England, and the sterling-dollar rate at \$4.04, and these prices were maintained subsequently. In pursuit of the gov.'s policy of maintaining

the purchasing power of sterling it was arranged that the vast bulk of transactions between sterling and other currencies should be conducted in London at official rates.

At the outbreak of war the gov. assumed complete control over international issues to which the money belonging to Brit. subjects might be put, but at first the gov. left the foreigner or person living outside the sterling area free to dispose of his assets, in England or elsewhere. But in June 1940 stricter control over the sale in the U.K. of securities by persons not resident within the sterling area was enforced by Orders in Council. Exchange regulations were issued by the Treasury with the object of placing the greater part of Brit. foreign trade on the basis of the official exchange rates, by tightening the exchange control and still further restricting the scope of the free sterling markets. A treasury Order prohibiting dealings in foreign securities without treasury permission was published in August 1939, under the Emergency Powers (Defence) Act, 1939. Owners of such securities were directed to make a return of their holdings to the Bank of England. Steps were also taken early in 1940 for the control of retail prices in the case of primary necessities. There was early a system of food and industrial controls designed to avoid the vicious spiral of rising costs and prices; and, to meet the problem of inflation through increased purchasing power, a substantial part of the surplus purchasing power of the public was withheld through the instrument of taxation. This was done in order to concentrate on the war effort as large a part as possible of the nation's productive resources, while at the same time satisfying the essential needs of the civil pop. and maintaining an adequate export trade.

See bibliography under BANK OF ENGLAND, and H. T. Easton, *History and Principles of Banks and Banking*, 1924; T. E. Gregory, *Select Statutes, Documents and Reports relating to British Banking, 1832-1928*, 1929; F. Lavington, *The English Capital Market*, 1934; R. Truitt, *British Banks and the Money Market*, 1936; G. Crowther, *An Outline of Money*, 1948.

Banking in France. In 1716 the celebrated John Law (q.v.) estab. the first bank of issue, Banque Générale, styled in 1718 the Banque Royale, the king guaranteeing the notes. It ceased to exist in 1721. Banks with limited issues carried on business, and there were attempts to reconstruct Law's bank. It was not till 1800 that Napoleon founded the Banque de France; at first its note issue was shared with departmental banks, which, however, were amalgamated with it in 1848, and it became the sole issuing bank in the country. It has now over 400 branches, and does an enormous business in discounting bills and making advances. Its deposit business is not so large. The specie reserves of the bank are very high, reaching before the Second World War £140,000,000 in

gold and £40,000,000 in silver, against a note circulation of nearly £200,000,000. In 1930 the gold reserve of the Banque de France was phenomenal, being the second highest in the world, the U.S.A. occupying the first place. The note issue is limited by law, but as long as the limit is not exceeded, it has not to hold any specific quantity of bullion against it. The bank can, to protect its gold reserve, pay notes in silver; the bank rate is therefore very steady. The governor and the 2 deputy-governors are appointed by the State. Other large banks in France include the Comptoir d'Escompte, 1848; Crédit Lyonnais, 1863; Société Générale... du Commerce, 1864; the Crédit Foncier, 1852, chiefly deals in mortgages. There are a large number of prov. joint-stock banks. The hoarding of gold in Fr. banks had a direct effect on the world financial crisis of 1931. By the middle of that year France had accumulated a stock of about £470,000,000 of gold which, added to the £1,000,000,000 in America, meant three-quarters of the world supply of monetary gold. This was the prin. cause—through the appreciation of the metal—of the catastrophic fall in prices that lay at the root of that crisis. On 2 Dec. 1945, a law was passed to nationalise the Banque de France and the 4 prin. deposit banks: Crédit Lyonnais, Société Générale, Comptoir National d'Escompte, and the Banque National pour le Commerce et l'Industrie. It also instituted strict gov. control over the activities of all other banks and set up a new body, the National Credit Council, to check the flow of credit in France.

Banking in Germany. The Imperial Bank of Germany (Reichsbank) received its constitution in 1875; the Bank of Prussia was merged with it in 1876. It was closely controlled by the Gov.; the Chancellor appointed the president and council, and a proportion of its profits went to the State. The right of uncovered note issue is limited by law, frequently extended, but the bank is permitted to exceed the limit repayment of 5 per cent on the surplus. The banks of Saxony, Bavaria, Württemberg, and Baden also possess the right of uncovered note issue but the amount is small in comparison with that of the Reichsbank. An important feature is the 'clearing' system (*Giro Verkehr*) of the Reichsbank; a debt to a customer of the bank can be paid by paying the money at any of the numerous branches; it will be without charge transferred to the credit of his account. It amounts to a money-order business without expense, and serves as a substitute for cheques, which are not used to the same extent as in England. The private and joint-stock banks in Germany are chiefly engaged in financing the country's trade and industries, and important banks, such as the Deutsche Bank (q.v.), took a prominent place before the Second World War in foreign and international finances. The Ger. banks are led by the 'Four D Banks'—from the initial letter of their names—viz. the Deutsche, the Disconto-Gesellschaft, the Dresdner, and

the Darmstadter. Since the end of the Second World War the banks in the Soviet zone of Germany have been nationalised.

Banking in Ireland. The Irish banks have been conducted generally on the same principles as those in Scotland. Most of those which were estab. in 1844 are still in existence—an indication of the stability of B. in I. But the assistance given in much more recent times by the existing banks to the general prosperity of Ireland has been equally marked. The Bank of Ireland was estab. in Dublin in 1783. Considerable privileges were granted to it, for, after 1820, no bank with more than 6 partners was permitted to issue notes within a radius of 50 m. from Dublin; but after 1845 this restriction was removed, and arrangements for the circulation of notes is now virtually the same as those in force in Scotland. There are 9 prin. banks in Ireland, 6 of which have the power of circulation. Their combined deposits total over £250,000,000 (1946). The Central Bank of Eire has the sole right in that country of issuing legal tender notes, and token coinage is issued by the finance minister through the bank. The Central Bank, which was estab. as from 1 Feb. 1943, in accordance with an Act of 1942, replaced the Currency Commission which was set up under the Currency Act, 1927, and had been responsible *inter alia* for the regulation of the note issue. On the dissolution of the Currency Commission its paid-up capital was returned to the shareholding banks.

Banking in Scotland. The Bank of Scotland was founded in 1695 by Act of Parliament. It issued notes of £100 to £5, and in 1704 £1 notes. In 1727 a rival bank, the Royal Bank of Scotland, was granted a charter, and in 1746 the Brit. Linen Bank. The private local banks ceased to exist by 1844, and Scotland shows an example of a small number of large banks with a highly developed system of branches, the number of offices to pop. being very high. The use of notes in business transactions is very great. The Act of 1844 fixed a limit to the issue of notes, beyond which the banks must hold specie; the banks of issue, now 8 in number, carry on the whole business of the country. Scottish banking hist. is marked by the disastrous failures of the W. Bank of Scotland, 1857, which failed for nearly £3,000,000, and the City of Glasgow Bank, 1878, which resulted in a total loss of over £6,000,000. Both these were unlimited liability companies. The Scottish banks, in addition to those named, are the Commercial, National, Union, N. of Scotland, and Clydesdale Banks. See A. W. Kerr, *History of Banking in Scotland* (4th ed.), 1926.

Banking in the U.S.A. In general, was founded upon the Eng. system; but it has developed distinctive features not found in most other countries. Amer. banks are primarily banks of deposit and credit and not of capital accumulation. In the early days of the rep. the people opposed centralisation of authority. Thus the

separate states retained among their sovereign powers the right to charter and supervise banks. As the country grew, however, purely local banks failed to meet the needs of national and international trade; and the right was granted to the Federal Gov. to charter banking institutions. Thus arose a dual system of state and federally chartered banks. The majority of the 14,186 Amer. banks in 1956 were unit banks under completely separate ownership and management. However, some states allow banks to operate branch offices, and there are affiliated banks under common ownership. This gives rise to the systems of 'branch' and 'chain' banking.

During the colonial period banking was carried on by commercial firms, and some thrift societies engaged in savings banking; in Massachusetts an attempt was made to establish a 'land bank' to capitalise land values as a basis for a currency. There was little actual money in circulation, and debts were paid in furs, tobacco, and other domestic products. What money there was included almost all kinds of European coins, from Sp. pieces of eight to Austrian thalers, of which the Bank of England had a large supply for use in Amer. trade. The official use of thalers is the reason why the U.S. monetary system was founded on dollars and not Eng. pounds sterling.

Immediately after the revolutionary war the various states chartered a number of banks; and private banking houses of trading and commercial firms began doing business. Some of them issued scrip money of purely local use and of varying value when offered in exchange for metallic coin or specie. Robert Morris, who had been Superintendent of Finance during the war, founded the first bank of national importance when the U.S. Congress chartered the Bank of N. America on 26 May 1781. It opened for business in Philadelphia in 1782. However, there was so much doubt as to the authority of Congress to grant bank charters that it secured a state charter from Pennsylvania. This bank joined the national banking system in 1863; and, although there have been changes through mergers and consolidations, its corporate existence continues to this day.

The estab. of a national currency was an important part of Alexander Hamilton's plan for a financial system under the constitution of 1789. Accordingly the first Bank of the U.S. was chartered in 1791 for a period lasting until 4 Mar. 1811. It issued circulating notes, discounted loans, and helped the gov. in financing operations. When its charter was not renewed the banking house and much of the assets were sold to Stephen Girard, who started the Girard Bank in Philadelphia. In 1816 the second Bank of the U.S. was authorised, and in 1819 the U.S. Supreme Court decided that the federal gov. had constitutional power to charter national banks. The 1816 charter expired in 1836; and, after continuing under a state charter for sev. years, the

second Bank of the U.S. was liquidated in 1841.

The period from 1836 to 1863 was a chaotic one for banking. While the banks in some states were soundly managed and supervised, those in others were purely speculative ventures for the issuing of currency. Paper money fluctuated widely in value according to the bank of issue; and business was severely hampered by the lack of a nationally accepted currency. To provide for financing the federal gov. during the Civil war, and to correct the lack of organisation among state banking systems, Congress in the Banking Act of 1863 authorised a national banking system; and since that time state and federally chartered banks have existed in the country. To-day banks of both types offer the same services, and the regulatory measures applying to them are comparable.

As the U.S. expanded across the continent, problems arose in connection with supplying various sections of the country with money to meet seasonal needs. A satisfactory solution was not found until Congress created the Federal Reserve System (q.v.) in 1913. Since its estab. the services provided by the Federal Reserve banks for the privately owned and operated banks of the country have proved of tremendous value. For example, it is estimated that 90 per cent of all payments are made by bank cheque; and, without the national system for clearing cheques between banks in widely separated cities, this transfer of funds would be seriously hampered. The Federal Reserve banks also hold the required reserves of member banks, averaging about 16.5 per cent on net demand deposits in 1956.

Because of the universal use of 'cheque-book' money and the system of fractional reserves, the Amer. banks are able to expand their net deposits about 5 times through credit transactions. The Federal Reserve System controls inflationary expansion of the money supply through credit extensions by increasing and decreasing reserve requirements, by modifying rediscount rates for member banks, and by limiting the amount of reserves available to banks through open market buying and selling of gov. securities.

Another instrumentality of the federal gov. important in banking is the Federal Deposit Insurance Corporation: an insurance fund which protects deposits in member banks up to \$10,000 for each individual depositor. Created by Congress in 1933, it became operative in 1934. All national banks are required to be members, and state banks may voluntarily qualify for membership. In 1956 approximately 95 per cent of all banks were members, and the insurance covered about 55 per cent of all deposits. The fund reported assets of \$1,640,000,000, equal to 1.41 per cent of insured deposits.

State-chartered banks which are not members of the Federal Reserve System receive services approximating to those of

the Federal Reserve by means of voluntary 'correspondent' relationships for mutual advantages.

Banks of deposit carry on overall financial service for their customers. These 'commercial banks' accept both savings and demand deposits and make loans to individuals and to business enterprises; they may provide trust services, have safe-deposit depts, and carry on other activities which cause them to be known as 'department stores' of finance. Mutual savings banks—527 in number—in 17 states specialise in savings deposits and restrict their credit extensions largely to real-estate mortgages.

The 14,186 privately owned and operated banks in the U.S.A. in 1956 reported assets of \$242,940,000,000, and deposits of \$217,930,000,000. These funds were used in loans and investments totalling \$195,730,000,000.

In addition to the privately owned and operated banks, there are federal savings and loan associations under the supervision of the Federal Home Loan Bank System, and building and loan associations under state supervision, which are share account institutions specialising in real-estate mortgages; the Federal Land Bank System; stock exchanges, and investment banking houses. In most other countries these institutions are administered as a part of the national financial system by a dept of the central bank or the treasury. See also FEDERAL RESERVE SYSTEM, U.S.A.

Bankruptcy. In England and Wales a bankrupt is a person who declares, or by his conduct makes it manifest, that he is unable to pay his debts, and whose property is accordingly distributed among his creditors under the B. laws. In its original signification the term bankrupt meant a trader who hid himself or did other acts tending to defraud his creditors. The term insolvent, which in one sense connotes any person who is unable to pay his debts, in a more restricted sense meant a non-trader who sought the benefits of the Insolvency Acts. Since 1861 bankrupt includes both traders and non-traders, and our whole modern law of B. applies indifferently to both. Insolvency now connotes the condition of a debtor who is unable to pay his debts but who has not been 'adjudged.' B. legislation dates from the time of Henry VIII, the most notable Act being that of 1825, which introduced the principle of deeds of arrangement as an alternative to B., subject to very severe restrictions. In 1869 all the previous statutes were repealed and a 'trustee,' in whom the property of the bankrupt was to vest, was substituted for the old 'official assignees.' The present law of B. rests on the general Acts 1883 and 1890, and various measures dealing with procedure, all of which Acts were repealed and substantially re-enacted in the Consolidating Act of 1914. The purpose of the Acts of 1883 and 1890 was to secure that the property of a person who could not pay his debts in full should be divided ratably among his creditors, and

that the debtor should then be freed from his debts either absolutely or conditionally. According to the present law, proceedings may be instituted by the debtor or by the creditors: in the former case the B. is called voluntary, in the latter involuntary. The claim of the creditors must amount to £50. On the petition being presented, the property of the debtor is taken over by an official receiver, who is an officer of the Board of Trade, and the debtor must make a full statement of affairs on oath in public, after which the creditors hold a meeting to determine whether the debtor shall be adjudged bankrupt or whether a composition can be arranged. Such a composition must be approved by three-fourths in value of the creditors, and must receive the sanction of court. If, however, the debtor is adjudged bankrupt, the creditors appoint a trustee to distribute his estate, under the supervision of a committee of inspection. The debtor is liable to imprisonment if he refuses to assist in the discovery of his property or conceals his goods from the trustee. After the distribution of his property among the creditors the bankrupt may obtain a discharge from the court, but the discharge is withheld under certain conditions: if he (1) has not kept proper books within 3 years before B.; (2) has traded after knowledge of insolvency; (3) has lived extravagantly or speculated rashly; (4) has been previously bankrupt; (5) has contracted debts without expectation of being able to pay them; (6) has given preference to any creditor within 3 months before B. By the B. Act of 1883 the procedure was simplified in the case of persons with property less than £300, when the official receiver became trustee, and there was no committee of inspection. The jurisdiction was transferred by this Act from the Court of B. to the High Court of Justice; it also provided for persons dying insolvent, the administration of whose property could formerly only be dealt with by a suit in chancery.

B. proceedings are now conducted under the B. Act of 1914, and the rules made thereunder as amended by the B. (Amendment) Act of 1926. By this Act previous statutes were consolidated and certain changes were made, chiefly in the direction of increasing the stringency of conditions and placing on the debtor the onus of proving himself not guilty of fraudulent intent. The jurisdiction under Debtors' Act, 1869, to commit debtors is now transferred to the B. court, which has power to make a receiving order instead of committing the debtor. An undischarged bankrupt is now guilty of a misdemeanour, the official receiver having the power to institute and conduct proceedings if he (1) either alone or jointly with another person obtains credit for £10 or over from any person without informing that person that he is an undischarged bankrupt; (2) engages in any trade under a name other than that in which he was adjudicated bankrupt without disclosing to all persons with whom he trades the name under which he was

adjudicated bankrupt; (3) has contributed to or increased the extent of his insolvency by gambling or hazardous speculation within 2 years of his petition; (4) falls on request of the official receiver in course of public examination to account for the loss of any substantial part of his estate incurred within a year before petition or to give a satisfactory explanation of the manner in which loss was incurred. An undischarged bankrupt must reveal his position when asking for credit; if he thinks such knowledge has been given to the creditor when it has not, he has no defence. General assignments of book debts not collected before B. become void unless registered as bills of sale, but this does not apply to a specific debt assigned.

A bankrupt is disqualified from holding office of (a) member of Parliament; (b) justice of peace; (c) mayor, alderman, or councillor; (d) co. councillor; such disqualification to cease if and when the adjudication of B. is annulled or the bankrupt obtains discharge with a certificate to the effect that B. was due to misfortune. An undischarged bankrupt may apply for discharge if his assets were more than 10s. in the £, if no criminal intent has been proved. A discharge order releases him from all obligations with certain exceptions, such as debts to the Crown, etc.

In Scotland a bankrupt is liable to the distributing process known as sequestration. A 'notour bankrupt' corresponds to a person who has committed what is called in England an act of B. There is no separate court of B., the jurisdiction being assigned to the sheriff of a co. or to the bill chamber of the court of session. The procedure closely resembles that in England. *See also INSOLVENCY. See Williams, Law and Practice in Bankruptcy* (17th ed.).

Banks and Banking. The term bank (derived from Fr. *banque*, a money-changer's bench or table) is applied to various forms of estab. which deal with money, including not only those institutions to which it more strictly applies, dealt with in this article, but also the great merchant and financial houses, discount businesses, and the like. Banks have been classified into banks of issue, i.e. those which have the right to issue their own notes, and banks of deposit, those which receive money from their customers. Another classification divides banks into private banks, those whose capital is owned by a limited number of partners, in Eng. law not more than 10, and joint-stock banks, where the shares are owned by a corporate body. The Bank of England is the only Eng. bank of issue, although other banks still issue notes in Scotland, Ireland, and the Isle of Man. The Bank of England notes are legal tender in England except at the bank itself. Though the bank-note is of the greatest importance in regard to the reserves held against deposits by the banks, the cheque is the medium by which business transactions of every kind are now carried on.

A bank, usually a joint-stock company, and with capital found by its shareholders, receives the money of its customers either on deposit, i.e. only to be withdrawn after certain notice, or on current account, i.e. to be withdrawn on demand during business hours. On deposit accounts interest is allowed, on current accounts usually none. The Bank of England allows no interest on deposits. These deposits, whether on deposit or current accounts, are the bank's liabilities, which it must be prepared to meet with cash on demand, and though in theory the liabilities might all be drawn upon at one moment, the system is based on experience that except in times of panic they never are. Thus the accumulation of deposits can be used by the bank for its own profit in financing the business and trade of the country, and expanding the credit on which it is built up. The balance sheet of one of the great joint-stock banks will show the kind of business which is done by them. On the debit side will be found the paid-up capital of its shareholders, i.e. the original working capital, the reserve fund, the accumulation of profits not paid out in dividends; then will follow the largest item, the deposit and current accounts of its customers, which form the bank's liabilities. On the credit side comes first the cash: (1) gold and notes in the tills, ready for the ordinary day-to-day drawings; these are normally small in amount, owing to the use of cheques; (2) cash held by the bank at the Bank of England, which, as the bankers' bank, is the centre of the Eng. banking system. Cash held at the Bank of England appears as 'other deposits' in the weekly bank return. Next upon the credit side appears the item 'loans at call or short notice'; these are day-to-day or weekly advances made chiefly to the brokers of bills of exchange at a low rate of interest. The largest amount is found in the item 'bills discounted and advances.' Not only do the banks discount bills themselves, but they finance by advances the merchants who confine themselves to that business; thus the banks play an important part in the supplying of credit to the trade and industry of the country, for it is the bill of exchange (q.v.) which is the prin. medium of the supply of credit. 'Advances' also include the loans made by the bank to its customers on securities of all kinds, from the large sums advanced to corporations, companies, bill-brokers, and discount houses, or to members of the Stock Exchange for dealings in shares, to the loans made to ordinary private persons on securities lodged with the bank or as overdrafts on personal security or guaranteed by a third person. The banks normally keep in cash about 8 per cent of their deposits, and at least 30 per cent in 'liquid assets'—cash, money at call and short notice, and bills discounted. The value of the bank's premises and investments made by it in the highest form of securities close the credit side of the balance sheet.

A bank is always faced by this problem:

if too much is laid up in cash reserve against its liabilities, there will be so much less available for making its own profits and for the financing of trade and industry; if too little, at any moment it may be called on to pay more than it can command in cash at once, with the consequence of selling its securities at heavy loss or of even suspending payment. The cash reserves of a bank are, as already mentioned, the cash in its tills and the reserve at the Bank of England, which is, in turn, a credit in the books of the bank. A control is kept by the banks, therefore, on the expansion of credit by the varying rates of discount allowed in the money market, so that some equilibrium is kept between their liabilities and their reserves (*see* MONEY).

Of all the business done by the banks, a very small proportion is carried on in gold or notes, for the commercial currency in, for instance, the U.K. and the U.S.A. is the cheque. The enormous amount of business done by the interchange of cheques is carried through not by paying in or out of notes and gold, but by book entries in the various banks through the clearing house (q.v.). The various banks at the clearing-house day by day balance all the cheques out and in against each other, and the differences are settled between them by a corresponding alteration in their accounts at the Bank of England, which is their common banker, and is not a member itself of the clearing-house. Similarly, when a loan or an advance is made by a bank, it usually consists of an entry in the bank's books, giving a credit against which the person to whom it is given has the right to draw cheques. Thus on a comparatively small capital of its own, with cash perhaps amounting to one-twelfth of its liabilities, an estab. bank does its work of providing the readiest way of settling a vast volume of transactions, and of providing the credit necessary to finance these transactions.

As the bankers' bank, the central figure is the Bank of England. (For a more detailed hist., *see* BANK OF ENGLAND.) The Bank of England is first of all the gov. bank, receiving all revenue payments, and paying the dividends, etc., to holders of gov. stock. It is the agent of the gov. in the financing of treasury and exchequer bills, and in other ways is the right hand of the gov. in the financial side of its administration. It is the only bank whose notes are legal tender, i.e. must be taken in payment of a debt. It is now the only note-issuing bank in England. The Bank of England is regulated by the Bank Charter Act, 1844, and by the Bank of England Nationalisation Act, 1946. The Bank Charter Act limited the note issue of all other banks in England and in Scotland and Ireland, but allowed the last 2 to exceed this, on an equivalent of gold for every note in excess. The monopoly of note issue in London and the 65-m. radius, granted in 1826, was retained, and no new bank could obtain the right. The Act separated the issuing and the banking depts of the Bank of England.

It could issue notes up to £14 millions, being the amount of its loans to the gov. at that date; this is the 'fiduciary' issue; above that amount the bank must hold an equivalent in gold coin or bullion. The bank is obliged to make a weekly return, reporting its financial position. This is issued every Thursday, and will be found in *The Times* and other papers on the Friday following.

Most of the notes in circulation are held in bankers' tills as their immediate day-to-day cash transactions require. The notes held by the Bank of England in its banking dept are the first line of defence against its prin. liability, that of 'other deposits,' which include the other banks' reserves, figuring in their balance sheets as 'cash at the Bank of England.' This with the bullion and coin is the Bank of England's reserve. The item on the debit side of the banking dept termed the rest is the equivalent of the reserve in other banking balance sheets, viz. the undivided surplus of profits; this is never allowed to fall below £3,000,000. The Bank of England rate, termed the bank rate, is the official *minimum* rate of discount at which the bank will discount bills; it is usually above that of the discount obtainable for money in the open money market; but if there is a shortage of cash, the tendency is for the open rate to equalise with the bank rate. *See also* BANK RATE; EXCHANGE; MONEY MARKET; BANKER AND CUSTOMER (LAW).

General History. Clay tablets have been found in Babylonia and Assyria showing some of the functions of the banker, such as money-changing, advances, and the like; we also know from the code of Hammurabi that payments were made through a banker and by drafts against deposits. Deposits bearing interest, letters of credit, and other means of transferring credits from one place to another were also known in ant. Greece and Rome. The Chinese are said to have had a paper currency about AD 800. But though it is possible to trace the evolution of banking, especially in Italy during the Middle Ages, continuously from early times, it is now accepted that the first public 'bank,' properly so called, was the Banco di Rialto, estab. at Venice by Acts of the Senate in 1584 and 1587. In 1619 the Banco del Giro was founded; this became the only public bank in the State, and was long famous as the Bank of Venice. Banking in Venice developed out of the money-changers and private exchange bankers, who as early as 1318 seem to have taken deposits, and as far back as 1270 gave security to the State for the proper carrying on of their business. It was the failure of many of these deposit banks that led to the founding of the Rialto Bank as a public bank by the State. The Bank of Venice suspended payment sev. times owing to its loans to the State, and ceased after the Fr. invasion in 1797. Another early It. bank was that at Genoa, the famous Bank of St George; this was a private bank of deposit; it was founded in 1407, and by its advances to the rep. dominated the State and managed the

public funds. The French appropriated its property in 1800. The bank had an earlier hist., dating back to 1200, as a merchant and financial company, and is the first example of a body of shareholders whose liabilities were limited to their shares.

The banks mentioned above were 'deposit' banks, receiving cash and paying it out on demand, and developed out of the business of the dealers in foreign exchanges. Another class of early banks was those which remained, at any rate principally, as exchange banks, of the utmost importance in the days when there was a large quantity of debased and clipped coin in circulation. Of these exchange banks the Bank of Amsterdam, founded 1609, lasting till 1820, and the Bank of Hamburg, 1619-1873, are the most famous. Their business lay 'in the assistance of commerce not by loans but by the local manuf., so to speak, of an international currency' (Palgrave, *Notes on Banking*). This currency was 'bank money.' Merchants brought coin or bullion to deposit, and were credited with the real intrinsic value; their credit was in 'bank money,' which they could draw on to meet their requirements. The income of the bank was gained from the small charges for such transfers in the books of the bank as were made from one merchant to another to meet their dealings. There is a good account of the working of the Bank of Amsterdam in Adam Smith's *Wealth of Nations*, iv. iii.

The next great step in advance was the appearance of the bank note, i.e. a promise to pay in coin made by the bank which issued it. If these notes were backed by a general confidence in the bank issuing them, they would circulate as cash, and thus create a great expansion of credit and business with an economy of actual metal currency. The invention of the bank note—apart, that is, from the Chinese paper money already alluded to—is due to Palmstruck, who founded the Bank of Sweden (Riksbank) in 1656; the first bank note was issued from the bank in 1658. The further hist. and development of modern banking is discussed in the entries dealing with different countries and with the various kinds of bank.

Banks, Elizabeth (d. 1938), Amer. authoress, b. Taunton, New Jersey. She began journalism as a society reporter on Baltimore papers, but later went to Peru as secretary to the Amer. minister there. She lived in England the greater part of her life, and wrote essays entitled 'The Lady of the Round Table' which appeared in the *Referee* under the pen-name Enid. She also wrote serial stories under the name Mary Mortimer Maxwell. Among her books are *A Dog of Belgium*, 1914, *On the Boat that Uncle Sam Built*, 1917, and *School for John and Mary: a Story of Caste in England*, 1925. *The Remaking of an American*, 1932, is an autobiography.

Banks, Sir Joseph (1743-1820), naturalist and explorer, b. London. In 1766 he made a botanical expedition to Newfoundland. From 1768 to 1771 he accompanied Cook in his voyage round

the world on the *Endeavour*, and his jour. proved an important source of information. In 1773 he made a trip to the Hebrides and Iceland, and was instrumental in bringing to the general notice the marvels of Staffa. He formed a valuable collection and library, which he bequeathed to the Brit. Museum. In addition to various scientific articles, he wrote *A Short Account of the Causes of the Diseases called the Blight, Mildew, and Rust*, 1805, and *Circumstances Relative to Merino Sheep*, 1809.

Banks, Nathaniel Prentiss (1816-94), Amer. politician and general, b. Waltham, Massachusetts. After being a factory worker and the editor of a local paper, he studied law and was admitted to the Bar. After a period of service in the Massachusetts legislature, he was in 1853 elected to Congress, where for some time he was speaker of the House. From 1857 to 1859 he was Governor of Massachusetts, and later became president of the Illinois Central railroad, which position he relinquished on the outbreak of the Civil war, when he joined the Federals. He was defeated by Jackson at Front Royal, and was later beaten at the battle of Cedar Mt. In 1863 he captured Port Hudson, but after his defeat at Sabine Cross Roads in 1864 he was relieved of his command. He re-entered Congress in 1865, and served as chairman of the committee on foreign relations. A mental disorder brought about his final retirement from public life in 1891. He was popularly known as the Bobbin Boy, in allusion to his early factory career.

Banks, Thomas (1735-1805), sculptor, b. Lambeth, London. Apprenticed at the age of 15 to a wood-carver, he studied sculpture in the evenings under Scheemakers. He continued his studies at the Royal Academy, where, in 1770, he gained the gold medal. In 1772 he gained a travelling studentship, worked in Italy for 7 years, and in 1781 proceeded to Russia, where he gained the favour of Catherine II, who purchased his 'Cupid catching a Butterfly' and 'Caractacus and his Family before Claudius.' He was elected R.A. in 1785. There are monuments by him in Westminster Abbey and St Paul's.

Banks Islands, group of is. N. of the New Hebrides, in the Pacific. There are 17 in all, the most important being Vanua Lava. The is. are volcanic and fertile. Pop. 2500.

Banksia, or Australian honeysuckle-tree, genus of shrubs and trees of the family Proteaceae, and named in honour of Sir Joseph Banks. They grow in sandy forest land or on rocks, and the flowers secrete a delicious honey; they do not produce good timber. *B. acmula*, *B. grandis*, *B. latifolia*, and *B. grandis* make small trees; *B. dryandroides*, *B. integrifolia*, and *B. media* are shrubs, chiefly grown for decorative use in Britain.

Bankside, riverside thoroughfare in the bor. of Southwark, London, between Southwark and Blackfriars bridges. It is the site of a famous Elizabethan and Stuart pleasure resort. Theatres (the

famous Globe as well as the Rose, Swan, and Hope), bear- and bull-baiting rings and taverns were situated here; and from earlier times there had been many brothels. As a centre of entertainment it had declined by the 18th cent. (See also *THEATRE, The Elizabethan Stage*.) On the S. side of B. stands the modern electric power station which began operating in 1952. The building is planned in 2 parts of which one has been completed.

Bann, rivs. in N. Ireland, known respectively as the Upper and Lower B. The Upper B. rises in the Mourne Mts and flows 40 m. NW. into Lough Neagh on its S. side. The Lower B., 40 m. long, issues from the NW. corner of the same lough and flows N. through Lough Beg into the Atlantic SW. of Portrush, dividing the cos. of Antrim and Londonderry.

Bannatyne Club, literary club founded in Edinburgh in 1823 by Sir Walter Scott and other Scottish antiquaries, notably David Laing, of the Signet Library, the club's first and only secretary, and Archibald Constable. It derived its name from George Bannatyne (1545-1609), the collector of the Scottish poetry of the 15th and early 16th cents. The club was formed for the printing of rare works relating to Scottish hist., literature, and antiquities. It was dissolved in 1861. Sir Walter Scott was the first president. During its career the club was responsible for the printing of 116 works, some of which are much sought after by collectors.

Banner, see FLAG.

Banneret, higher rank of Eng. knight-hood conferred for distinguished conduct on the field of battle, and which entitled the recipient to lead his vassals under his own banner. Part of the impressive ceremony consisted in the changing of the knight's pennon for a banner. The last knight B. proper was Sir John Smith, who received the dignity from Charles I for bravery at the battle of Edgehill.

Bannermann, Sir Henry Campbell-, see CAMPBELL-BANNERMANN.

Bannerol, see BANDEROLE.

Bannister, Roger Gilbert (1929-), athlete, b. Harrow, Middx. He was the first man in the world to break 4 min. for the mile, at Oxford in May 1954. This great feat had been the goal of the world's most brilliant middle-distance runners for years. His time of 3 min. 59.4 sec. stood as a world record for only 6 weeks before being broken by John Landy (Australia) in 3 min. 58 sec. B. beat Landy later in the year at the 1954 Empire Games, Vancouver, in one of the finest mile races ever run. That same season B. also won the European 1500 metres (metric mile) title and then retired to concentrate on his work as a doctor, having redeemed himself for his 'failure' in finishing fourth in the 1500 metres at the fifteenth Olympiad held at Helsinki. See his book *First Four Minutes*, 1955. See also *ATHLETICS*.

Bannock (Gaelic *bannmach*, a cake), round cake, common in Scotland, made of pease or barley meal, or a mixture of the two. A mashlum B. is one made of mixed meal. It is baked on an iron plate known as a girdle.

Bannockburn (Gaelic 'the stream of the white knoll'), tn. of Stirlingshire, Scotland, on the Bannock Burn, 3 m. SE. of Stirling, the scene of the great battle, fought on 24 June 1314, in which 30,000 Scots under Robert Bruce inflicted a crushing defeat on 100,000 English under Edward II. The victory was largely due to Bruce's device of undermining the front of his position with pits covered with turf and rushes, into which the Eng. cavalry were precipitated in helpless confusion. The English are said to have lost 30,000 men. The 'Pore Stone' is still shown on which Bruce is reputed to have set up his standard. (See J. E. Shearer, *Fact and Fiction in the Story of Bannockburn*, 1909.) B. has textile and woollen manufs., chiefly carpets. Pop. 4,000.

Banns, see MARRIAGE.

Bannu, tn. of W. Pakistan, at one time called Edwardesabad. It lies in the valley of the Kuram R., and was noted as the base for all punitive expeditions to the Tochi Valley and Waziri frontier.

Banshee, in Irish and W. Highland folklore a guardian female fairy who by shrieks and wallings foretells the death of a member of the family over whose fortunes she watches.

Báňská Bystrica: 1. Region (*kraj*) in SE. Czechoslovakia bordering on Hungary, part of the former prov. of Slovakia (q.v.). It is mountainous except in the S., and is watered by sev. tribs. of the Danube and the Tisza (qq.v.). Area 3560 sq. m.; pop. 487,000.

2. (Ger. *Neusohl*; Magyar *Besterce-banya*) Czechoslovak tn. cap. of the region of Báňská, on the Hron. It is the seat of a bishop, and has an important textile industry. Pop. 12,000.

Banstead, urban dist. of Surrey, England, 14 m. from London, comprising B., Chipstead, Kingswood, Tadworth, Walton-on-the-Hill with its famous championship golf-course (Walton Heath), and Woodmansterne; the dist. has extensive commons and other green belt land. Pop. 33,526.

Bantam, seaport of Java, 40 m. W. of Jakarta.

Bantam Fowl (*Gallus bankiva*), ornamental variety of domestic fowl noted for its small size, silky appearance, and pugnacious disposition. It came originally from the E. It weighs little over a pound and has fluffy legs; the hens are good layers, the flesh is good, and the eggs are of a delicate flavour.

Bantayan, is. of the Visayas group, Philippines, 10 m. from the is. of Cebu. Area about 40 sq. m. It grows corn and coco-nuts, and there is fishing. Pop. 28,602.

Banteng (*Bibos banteng*), species of wild ox, found in the Malay peninsula and archipelago. It resembles the gaur (*Bibos frontalis*) of India, but it is of a lighter build, has a longer, sharper head, and more rounded horns. The cow is bright dun in colour, with white legs and short hair. The back rises to a hump behind the neck. The B. inhabits jungles and forests, and is very ferocious. It has,

however, sometimes been tamed by the Malays and interbred with the zebu.

Banting, Sir Frederick Grant (1891-1941), Canadian physiologist, the discoverer of insulin. Prof. of medical research at the Univ. of Toronto, where a special institute was built for him. B. at Alliston, Ontario, and educ. in the schools of that tn and at Toronto Univ., where he graduated in medicine. In 1923, with J. J. R. Macleod—who had directed his and C. H. Best's investigations, at Toronto Univ., into the internal secretions of the pancreas, 1921-2—he was awarded the Nobel prize for medicine; these investigations having resulted in the isolation from the pancreas of the hormone insulin, making possible the treatment of *diabetes mellitus*. He was knighted in 1924. When the Second World War broke out, 1939, B. joined the Canadian Army and was appointed director of a military hospital in England; but he was recalled to Canada to take charge of medical research in connection with air warfare. He met his death in a plane accident when travelling between Newfoundland and Canada. The world owes him a great debt of gratitude for his discovery. The Canadian Gov. took the unusual step of voting him a life pension to enable him to continue his medical research.

Important progress in the study of *diabetes mellitus* was made in the 17th cent. by Thomas Willis, while late in the 19th cent. Claude Bernard, von Mering, and Minkowski made further progress in that their observations suggested that extracts made from pancreatic glands must contain some principle which prevented the accumulation of an excessive amount of sugar in the blood. B. thought that the reason why effective extracts could not be obtained was that the secretion produced by the pancreas contained a substance which could destroy the anti-diabetic principle. It was evident that the pancreatic extract must be secured in such a way that it was free from this destructive substance. B. conceived that this could be done by ligating, or tying up, the pancreatic duct and allowing time for certain cells in the pancreas to degenerate. Macleod arranged that C. H. Best should collaborate with B. on the chemical preparation and physiological testing of the extracts, and, on 23 Jan. 1922, insulin was injected into a human patient, a boy of 14 years of age, with brilliant results. Thus did a scientific achievement, centring on a single experiment, lead to important results for human welfare. See life by L. Stevenson, 1946, and N. S. Papaspyros, *History of Diabetes Mellitus*, 1952.

Banting System, diet treatment advocated for the reduction of fat. The cure was first proposed by Harvey, and was practised by Wm Banting (1797-1878), an undertaker, of St James's Street, London. At the age of 66, and scaling over 14 stone, he denied himself bread, butter, milk, sugar, beer, soup, potatoes, and beans, and took in their stead meat, fish, and dry toast. By this treatment he reduced his weight by over 3 stone and his girth round

the waist by 12½ in. B. wrote a pamphlet on the subject, entitled *A Letter on Corpulence, addressed to the Public*, 1863, which ran into many eds. See also **FOOD AND DIET**.

Bantock, Sir Granville (1868-1946), Eng. musical composer, b. London, son of George Granville B., M.D. He was trained at the Royal Academy of Music, and ed. *New Quarterly Musical Review*, 1893-6. He toured America and Australia, conducting for Gaiety Theatre touring company, 1894-5. He was director of the School of Music, Birmingham and Midland Institute, from 1900, and later prof. of music at Birmingham Univ. until 1934 when he was made chairman of the Corporation of Trinity College, London. He wrote a number of songs, orchestral music, and much choral music, including choral symphonies (without orchestra), such as *Atlanta in Calydun* and *Vanity of Vanities*, and large-scale works with orchestra, such as *Omar Khayyam*. His orchestral works include the *Hebridean Symphony*. He was knighted in 1930. Life by H. Osmond Anderton, 1915.

Bantry, seaport and tourist resort in co. Cork, Rep. of I., at the head of B. Bay, 50 m. from Cork. It has fisheries and textile manufs. The chief export is agric. produce. B. Bay, 25 m. long and 4-6 m. broad, affords fine anchorage. T. M. Healy (1855-1931) was b. in B. Pop. 2500.

Bantu, term applied to those African Negroes who speak B. languages. They are probably a mixture of True Sudanic Negroes and Hamites, and stretch from the 'B. line' in the N. of the Congo and in E. Africa to S. Africa, comprising many hundreds of tribes in E., Central, and S. Africa. Apart from their related languages they have little in common. Some of them are organised into kingdoms, others have simple organisations without chiefs. Some trace descent patrilineally, others matrilineally. Some are cultivators, others are mainly pastoral. Almost all of them practise ancestor worship, but in conjunction with other cults. They are usually subdivided into the S. B. (Zulu, Swazi, Xosa, Tswana, Basuto, Venda, Ndebele or Matabele, Pondo, Pedi, etc.); the Central B. (Shona, Bemba, Lozi, and other tribes of the Rhodesias); the W. B. of the Congo and Angola, and the N.E. B. of E. Africa (Kikuyu, Kamba, Chagga, Ganda, etc.). See **NEGRO** (and articles on tribes). See also C. G. Seligman, *The Races of Africa*, 1939, and I. Schopera, *The Bantu-speaking Tribes of South Africa*, 1950. For languages see C. M. Doke, *Bantu*, 1945, and *The Southern Bantu Languages*, 1954; M. Guthrie, *The Classification of the Bantu Languages*, 1948.

Banville, Théodore Faullain de (1823-1891), Fr. poet, b. Moulins. His first vol. of verse, *Les Cariatides*, 1842, stamped him as a romantic, and was followed by *Les Stalactites*, 1846, *Odelettes*, 1856, *Odes funambulesques*, 1857, *Nouvelles Odes funambulesques*, 1869, and *Idylles prusiennes*, 1871, this last inspired by the Franco-Ger. war. His *Petit traité de*

versification française, 1872, is a valuable work on Fr. versification, of which he proved such a dexterous master. His delightful handling of ballades, rondeaux, and other medieval forms of verse was the starting-point of a notable revival in that kind of poetry. See his *Mes Souvenirs*, 1882; also J. Charpentier, *Théodore de Banville*, Paris, 1925.

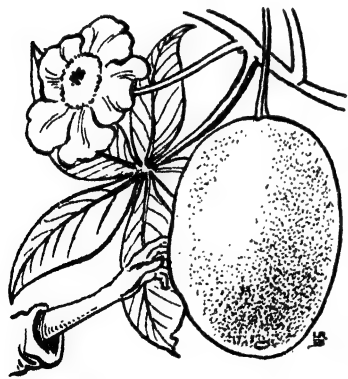
Banyan Tree (*Ficus benghalensis*), family Moraceae. The B. is a sacred tree in India. It grows on an erect plant, and its roots hang downwards like thick supporting pillars. It often covers much space and grows to a great height. Gum-lac and caoutchouc are produced from the B., and the bark is used in Hindu medicine.

Banyuls-sur-Mer, Fr. fishing-port in the dept of Pyrénées-Orientales, on the Mediterranean. It is a popular bathing resort, and has good wines. Pop. 3700.

Banyumas, or **Banjoemas**, tn of Java, on the Serajo, 170 m. SE. of Jakarta. It is an agric. trade centre, with a tobacco processing industry. Pop. 6700.

Banyuwangi, or **Banjoewangi**, seaport tn on the E. coast of Java. The prin. industries are saw-milling and rubber. Pop. 25,000.

Bao Dai, last emperor of Viet Nam (q.v.). A member of the Nguyen dynasty, B. D. succeeded the Emperor Khai Dinh in 1925 when he was only 12 years old. He remained on the throne throughout the Jap. occupation of Viet Nam, 1940-5, but abdicated after Japan's surrender in 1945 and went into exile. B. D. returned to Viet Nam in 1949 as Head of State, an office which he held until he was deposed in 1955 by a plebiscite held in S. Viet Nam. He now lives in Franco. See E. Hammer, *The Struggle for Indo-China*, 1954, and the supplement, *The Struggle for Indo-China Continues—Geneva to Bandung*, 1955.



BAOBAB MONKEY FRUIT

Baobab (*Adansonia digitata*), species of Bombacaceae found in Africa and Australia. It is one of the largest trees known, having an enormous trunk, sometimes 30 ft

thick. Various parts of the plant have different uses, the bark having a strong fibre and being the chief ingredient of a febrifuge, the fruit (called monkey-bread) consisting of a pleasant though acid pulp and a juice which makes a cooling beverage, the leaves being of use medicinally and for food.

Bapaume, Fr. tn in the dept of Pas-de-Calais. In 1871 it was the site of an indecisive battle in which the French claimed the advantage (see FRANCO-GERMAN WAR). During the First World War B. was an important position in the battles of the Somme (q.v.). It changed hands sev. times, and by the end of the war had been destroyed, but was afterwards rebuilt. Pop. 2600.

Baphomet (medieval form of Mahomet), idol with 2 heads, male and female, which the Templars were accused of worshipping in secret with licentious rites.

Baptis, genus of lepidopterous insects of the family Geometridae. The species are among the thin-bodied, day-flying, delicate moths with large wings. *B. bimaculata* and *B. punctata* are both found near London; the former is white with 2 brown spots on the front edge of the anterior wings, while the latter has the tips of its anterior wings clouded with brown.

Baptism (Gk *baptismos*, a dipping in water, a ceremonial ablution), the Christian initiatory sacrament. The use of water as a symbol of purification is so natural that it is not surprising that it is found in many religions before and after Christianity. The Jews practised a ceremonial B. of proselytes after circumcision, and John, the forerunner of Christ, baptised people (including Christ Himself) as a sign of the repentance required in preparation for the coming of the Messiah. John expressly distinguished his B. as a mere symbol of repentance, in itself ineffectual (a B. of water only), from the B. that the Messiah would bring, which would be full of power ('He shall baptise you with the Holy Ghost and with fire'). Christ applied these words to the coming of the Holy Ghost at Pentecost (Acts i. 5), upon which the effectiveness of the whole apostolic ministry depends; but He also trained His disciples to baptise (John iii. 22; iv. 2), and in His final charge after the Resurrection, recorded in Matt. xxviii. 19, told them to teach all nations, baptising them in the name of the Father and of the Son and of the Holy Ghost. The Apostles recognised a vital difference between the symbolic B. of John and Christian B. as administered at any rate after Pentecost, as is shown by the rebaptism of John's converts (Acts xix. 5). The N.T. is full of teaching as to the meaning, the nature, and the effect of Christian B. John iii. gives the direct teaching of Christ on the subject, in which He describes it as a rebirth by water and the Holy Ghost without which a man cannot enter the Kingdom of God. After His first sermon on the day of Pentecost St Peter, when asked by his hearers 'What shall we do?' replied: 'Repent and be baptised every one of you in the name

of Jesus Christ for the remission of sins, and ye shall receive the gift of the Holy Ghost.' St Paul (Rom. vi) makes use of the symbolism of B. (by total immersion) as denoting that the Christian thereby shares in the death and resurrection of Christ, dying to sin and rising to righteousness.

The Catholic teaching on B. (repeated by the Church of England in her Catechism) is that it washes away and forgives all sin (both original sin and actual sins committed before B.), that it unites the recipient to Christ and makes him a member of His Body, the Church, and that it bestows upon him, at any rate in germ, a new nature, the new manhood of Jesus Christ, which has to be nourished and developed until it replaces the old fallen manhood. Since B. confers a new nature permanently, it can never be repeated. This doctrine is one of the articles of the Nicene Creed: 'I acknowledge one baptism for the remission of sins.'

The outward sign of B. is the passing of water over the person's body, accompanied by the words 'I baptise thee in the name of the Father and of the Son and of the Holy Ghost.' No substitute for water is permitted. The person may be totally immersed in the water, or it may be poured over the body (normally over the head). The action should be performed 3 times, once at each of the 3 divine names (cf. Prummer, *Theol. Mor.* III, ii. 102). The water must wash the skin of the recipient, i.e. it must flow over it. For that reason affusion (pouring) is a proper method, while aspersion (sprinkling) is an uncertain and improper method. Affusion is now the normal method in the W. (and the Anglican) Church, though immersion is permitted and was general earlier, as the ancient baptistries in Italy (e.g. Naples) show.

The normal and regular minister of the Sacrament is a priest; but in an emergency anybody may administer B., even one who has not been baptised or who is not a Christian.

The proper subject of B. is any person of any age who has not yet been baptised. In the case of a person above the age of discretion (i.e. capable of discerning right from wrong and so of sin, and normally older than 5 to 7 years) the proper dispositions are necessary, i.e. faith and repentance. In the case of infants, however, these dispositions are adequately expressed by adult sponsors (q.v.) who promise to bring them up to have the right dispositions when they are capable of them.

At the Reformation Calvinists and Zwinglians repudiated most of the sacramental teaching of the Church, including that concerning B., though they retained the rite (as required in scripture) as a symbol of repentance and of incorporation into Christ. The Baptists and Anabaptists rejected infant B., arguing that there was no evidence for it from scripture, and that it was a meaningless rite apart from conscious faith and repentance, expressed by the individual recipient. With the abandonment of the doctrine that B.

imparts a new nature or regenerates *ex opere operato* (see SACRAMENTS), the belief that B. cannot be repeated is logically abandoned too; and baptising of adults in large numbers on repeated occasions has been a feature of many Protestant Revival meetings.

It is true that B. in the Apostolic Church was mainly of adults, since the greater number of converts at first were adult Jews, proselytes, or pagans. It seems certain, however, that infants were included in some of the B.s of whole households mentioned in Acts (e.g. xvi. 32-3). Children had always a recognised place in the Jewish Church, and it is clear that the New Dispensation did not abolish that position (cf. Mark x. 13-14). The B. of infants was a natural corollary from the circumcision of infants which it replaced. Nevertheless the severe discipline imposed by the early Church on its members who committed grave sin after B. led many (especially after the conversion of the empire under Constantine had diluted the faithful with many formal Christians) to postpone B. until late in life so as to leave as little scope as possible for such sin and to escape responsibility. This abuse was remedied by the development of a more lenient penitential discipline, and of confession (q.v.). The rite of B. was accompanied in the early Church (and still is in the Lat. and oriental rites) by a number of striking and instructive ceremonies that draw out the meaning of the simple sacramental act. The Protestant reformers abandoned all of these, but the Church of England retained the signing of the head of the infant with a sign of the cross (though consecrated oil was no longer used for the purpose). The custom of bestowing a Christian name at B. naturally derived from the similar Jewish practice at circumcision (cf. Luke i. 59-63; H. 21). Another name for B. in England is christening, the meaning of which is obvious.

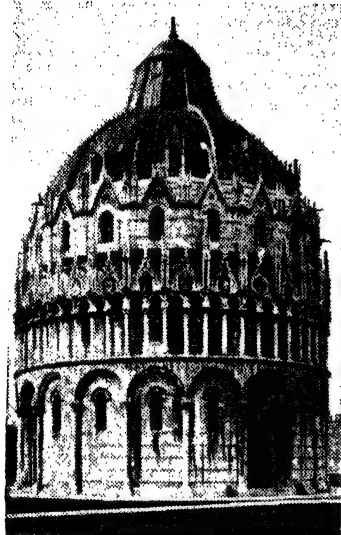
Baptist World Alliance, formed in 1905 on the occasion of the first Baptist World Congress in London. Its object is to 'manifest the essential oneness in the Lord Jesus Christ and to promote the spirit of fellowship among the Baptist order and faith throughout the world.' The alliance has since organised several international congresses in the Old and New Worlds, the latest being that held in London in 1955. In its *Directory* the alliance claims churches in 90 countries, with a total communicant membership of nearly 21,000,000 (1955).

Baptist Youth Fellowship, national organisation of all the young people between the ages of 12 and 24 in churches of the Amer. Baptist Convention, totalling 400,000 in 1956. It was founded in 1941 as the successor to the Baptist Young People's Union of America, with H.Q. at 1703 Chestnut Street, Philadelphia, Pennsylvania.

Baptiste, Jean Baptiste Monnoyer (or Monoyer), see MONNOYER.

Baptiste, John Gaspar (1-1691), Flem. painter, b. Antwerp; a pupil of Bosschaert. He came to England during the Civil war, and served in Lambert's army;

but, after the Restoration, returned to his original profession, and was much employed by Sir Peter Lely in painting his draperies and backgrounds. He worked occasionally also for Kneller and Riley. He made designs for tapestries which reveal skill in drawing. There is a portrait of Charles II in St Bartholomew's Hospital by this artist.



W. F. Mansell

THE BAPTISTERY OF PISA

Baptistry, building in which Christians performed the ceremony of baptism. The most celebrated existing B.s are those of Rome, Florence, and Pisa; the most ancient is the B. of S. Giovanni in Fonte, near the church of St John Lateran at Rome, commonly said to have been erected by Constantine the Great. The plan of this building is an octagon, with a small portico at the entrance; the interior is decorated with 8 porphyry columns, the finest of the kind in Rome. The diameter of this structure is about 75 ft. The B. of Florence, which is octangular, with a diameter of about 100 ft, stands opposite the prin. entrance of the cathedral. The 3 bronze doors are celebrated for their bas-reliefs, and for the marble and bronze figures above them. The B. of Pisa, erected between the years 1152 and 1160 by Diotisalvi, is a singular design. The plan is circular, with a diameter of 116 ft; the building is raised on 3 steps, and surmounted with a dome in the shape of a pear.

In modern Anglican churches, a bay or corner near the W. end is often reserved for purposes of infant baptism. In modern Baptist churches, a sunk tank is

provided for total immersion, with steps descending to it.

Baptists, Christian denomination who differ from others in regard to the views which they hold concerning baptism. The distinctive view of the B. is that only believers should be baptised, and their method of baptism is by immersion. The modern B. generally reject any connection with the Anabaptists. They base their doctrines upon the teachings of the Apostles, and some maintain that throughout the corruption of the Christian Church during the medieval period their doctrines were maintained by the Cathari and the Albigenses. The beginning of the modern Baptist Church, however, is traced to the work of John Smyth in the reign of James I. John Smyth was originally an ordained minister of the Eng. Church who broke away from that Church and fled to Holland. Here he fell under Mennonite teaching, and after severing his connection with the independents, whom he had joined, he issued a confession of faith for the first Eng. Baptist Church 'of Eng. people remaining in Amsterdam in Holland.' This declaration of faith laid down the 2 main doctrines of the Baptist Church, 'to receive all their members by baptism upon the confession of their faith and sins,' and that 'baptism in no wise appertaineth to infants.' Smyth d. in Holland, but his chief follower came to England in 1612, the year of Smyth's death, and estab. his church in Newgate. This was the origin of the 'General' Baptist denomination in Great Britain. The General Baptist denomination repudiated Calvinistic doctrines, holding to the views of the Arminians, and maintaining the doctrine of universal redemption. The beginning of the Particular Baptist Church in England may be traced to the Jacob church in Southwark, and its foundation may be approximately dated as taking place in the year 1633. Of this Jacob church the famous Praise-God Barbon was a member. The Particular Baptist Church was the direct offshoot of the Independents, and was therefore Calvinistic in doctrine. Both sections of the Baptist Church suffered persecution during the reign of Charles II, but the passing of the Toleration Act of 1689 gave liberty of worship and freedom from persecution to the B., together with other dissenters. The B. continued in this divided state for some very considerable time—the Arminian section, who held the doctrine of a general redemption, being known as the General B., and the Calvinistic section, who held the doctrine of a particular redemption, being known as the Particular B. A schism took place towards the end of the 18th cent. in the ranks of the General B., and a General B. New Connection was formed, the old connection becoming Unitarian. The names General and Particular B. gave rise to the impression that the General B. were those who admitted to their communion members who professed faith in Christ but did not agree with their views on baptism, and Particular B. those who clung jealously to their own doctrines and refused admission.

This idea, however, is entirely wrong, the names applied respectively to convey that idea being 'open B.' and 'strict B.' In 1891 the 2 sections of the B. were united into one body, known as the Baptist Union of Great Britain and Ireland. This union was due principally to the efforts of the Rev. John Clifford (q.v.). The method of Church gov. is congregational, the officers of the Church being the pastor, the deacons, and evangelists. Each church is self-governing, and is subject to no external pressure. The B. have a fine missionary tradition, going back to Wm Carey, and a number of colleges for the training of young men for the ministry. At the present day the B. have members in every part of the world. In the U.S.A. the first Baptist church was estab. at Providence, Narragansett Bay, by Roger Williams, in 1639. Another church was founded at Aquidnek, Rhode Is., 1641, and one at Newport, 1644. The Providence church did not flourish, but the Newport church increased its influence, and a branch was formed at Rehoboth, Massachusetts, 1649. The B. suffered persecution, but this only resulted in spreading the churches, and further branches were formed. The need of organisation was felt, and in 1707 the Philadelphia Association was formed 'to consult about such things as are wanting in the churches, and to set them in order.' At Charleston the Charleston Association was formed in 1751. A Baptist college was founded in 1764 (known since 1804 as

Brown Univ.). By 1812 there were 173,972 members of Baptist churches in the U.S.A. B. are numerically strongest in the U.S.A. In the Brit. Isles there were (1954) 3800 chapels, and their members numbered 326,000. In U.S.A. the number of adherents is 18,000,000. Baptist churches were formed in the old Russian Empire about the middle of the last cent., but suffered repression under the tsardom in the interests of the Orthodox Church. In the U.S.S.R. there are 512,000 Baptist Church members. A Baptist World Alliance was formed in London in 1905. Its H.Q. are now in Washington, D.C. The total communicant membership was stated in 1955 to be: Europe, 1,106,000; Asia, 642,000; Australasia, 45,000; Africa, 222,000; Central America and W. Indies, 98,000; S. America, 132,000; N. America, 18,500,000; making a total world figure of nearly 21,000,000. Sev. Baptist Unions and Conventions are in membership with the World Council of Churches. See H. C. Vedder, *A Short History of the Baptists*, London and Philadelphia (revised ed.), 1897; W. T. Whitley, *Baptist Bibliography*, 1916, and *A History of British Baptists*, 1923; J. H. Rushbrooke, *The Baptist Movement in the Continent of Europe* (revised ed.), 1923; A. C. Underwood, *A History of the English Baptists*, 1948; E. A. Payne, *The Fellowship of Believers* (revised ed.), 1952; F. T. Lord, *Baptist World Fellowship*, 1955; also *The Baptist Handbook*, annually.

NEW DELHI.
DATE LOANED

This book may be kept for

Fourteen days

A fine of **.06 nP.** will be charged for each
day the book is kept over-time.

--	--	--	--

Sardar Dyal Singh Public Library,

NEW DELHI.

1. Books may be retained for a period not exceeding 14 days.
2. Books may be renewed on request if they are not required by some other member of the Library.
3. Dog-earing the pages of a book; marking or writing therein with ink or pencil; tearing or taking out pages or otherwise damaging it will constitute an injury to a book.
4. Borrower's will be required to pay full price of any book lost or damaged by them.

HELP TO KEEP THE BOOK NEAT AND CLEAN